The Garden Journal

of The New York Botanical Garden

Vol. 3, No. 6 Nov.-Dec., 1953

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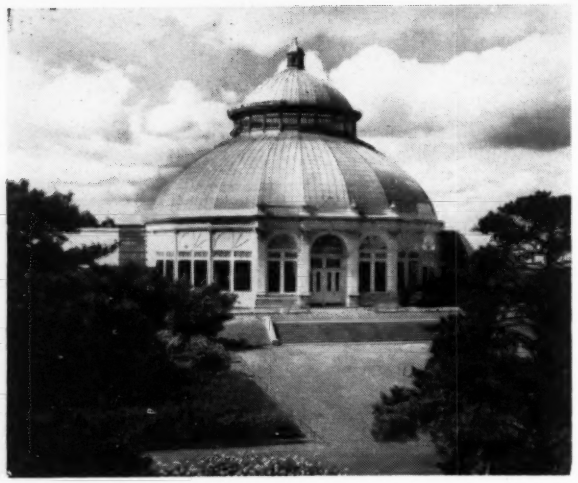

November 6-22. "Autumn Glory — A Pageant of Chrysanthemums" in the Conservatory of The New York Botanical Garden.

December 18-January 3. Christmas Flower Display. in The Conservatory of The New York Botanical Garden. The Nativity scene will also be reproduced here.

DOROTHY EBEL HANSELL
Editor

THE GARDEN JOURNAL
of The New York Botanical Garden

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CREDIT FOR ILLUSTRATIONS

Front cover, colored illustration of *Philodendron hastatum* by Walter Singer; pp. 170, 171, 172, Dr. Bassett Maguire; pp. 174, 175, Florida Agricultural Experiment Station; pp. 176, 177, 178, E. N. Mitchell; p. 179, A. Horner & Sons, Settle, Yorks — courtesy author; pp. 181, 182, courtesy Mrs. Amy Spingarn; p. 183, the author; p. 185, the author; pp. 188, 189, 190, 191, drawings by the author; p. 193, the author; p. 198, Flora Brasiliensis.

AMONG OUR CONTRIBUTORS

DR. BASSETT MAGUIRE, Curator of The New York Botanical Garden, left the fore part of October on his twelfth expedition to Venezuela. Accompanied by Dr. John Wurdack and George Bunting, also identified with the Garden, he will again explore the Guayana Highlands, Territorio Amazonas, and in particular the mountain range Serrania Imeri. The expedition is being carried out under a grant from the National Science Foundation and will extend until April or May 1954. On the Witherbee-Kunhardt expeditions reported in this number of The Garden Journal, Dr. Maguire and his party collected some 15,000 specimens and traversed 1,200 miles by air, 3,000 miles by ship at sea, 5,000 miles over rivers with an outboard motor, 1,000 miles by truck and auto, 500 miles on foot. On this coming expedition, Dr. Maguire states, "We expect to cover only 3,000 river miles—as far as Europe and back." Over all, the eleven previous expeditions of The New York Botanical Garden have resulted in plant collections greatly in excess of 75,000 specimens. The field work in the present biennium completes that upon which a Flora of the Guayana Highlands is being written. The numerous expeditions to Venezuela to date are also building toward a Flora of Venezuela, a cooperative project between The National Herbarium of Venezuela and The New York Botanical Garden now under way. This larger work is going to employ considerable scientific manpower from both the Venezuelan Ministry of Agriculture and the Garden for about eight years. . . . In the Sarasota, Florida, library there is a collection of water colors of five hundred Florida wild flowers which DR. ANNE E. PERKINS and J. M. Hall collected. They were named by Dr. Perkins, with index. The water colors were painted by the late Grace Estabrooks. . . . DR. H. W. RICKETT is bibliographer of The New York Botanical Garden. . . . R. H. BRIGGS is secretary of the National Auricula Society. From his home, "High Bank" in Rawtenstall, he can see "Ingleborough Hall" with the aid of field glasses. . . . DR. E. J. KRAUS, formerly head of the Department of Botany of the University of Chicago and for some years member of the staff of the Department of Horticulture of the University of Oregon, was recently voted one of the "greatest living horticulturists." . . . MARGARET P. (MRS. J. WILLIS) SLAUGHTER is a very enthusiastic gardener and participates actively in garden projects. This spring she was awarded the Eloise Paine Luquer Medal by the Garden Club of America for her distinguished contributions in the field of botany. . . . It was her grandmother Ludlam's garden which first stirred ELISE (MRS. C. R.) BOWLES' interest in growing plants herself. Four years study of botany at Barnard College and four months spent as a farmerette furnished valuable background and experience. Her interest in plants has continued as is evident by the lovely garden at her home just north of Bronxville, N. Y. Mrs. Bowles not only gardens but puts the knowledge she has gained from her gardening to use in writing and lecturing about plants. . . . SARAH R. RIEDMAN is Assistant Professor of Biology at Brooklyn College. She and her publishers, Thomas Nelson & Sons, very kindly granted permission to reprint part of chapter five from her book, GRASS: OUR GREATEST CROP, 1952. . . . FRANK RICH, JR., resides in Los Angeles, where he specializes as a display artist. His interest in plants began some years ago, and he soon found himself president of a garden club. Eventually he became president of every garden group he joined until he learned that "that is not the way to win friends, influence people, and really get serious about growing plants." So he centered his attention on the genus *Philodendron* and within four years has built up a large collection of species and varieties, in an effort to name them correctly as they come into flower. Mr. Rich hopes in this way to "perform some small service by helping to clear up the confusion caused by multiple commercial names for a single species or variety or by many different species being sold under one name." . . .WALTER SINGER is greenhouse foreman of The New York Botanical Garden. . . . GERTRUDE B. FOSTER is editor of "Herb Grower Magazine."

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The Witherbee-Kunhardt Guayana Expeditions

By **Bassett Maguire**

The following is an extract from the report made to the Director of The New York Botanical Garden by Dr. Bassett Maguire.—*The Editor.*

THE objectives of the 1952-53 biological explorations to Guayana were three-fold: first, to continue the exploration of the Gran Sabana area chiefly to the Chimantá-Acopán-tepuí massifs; second, the exploration of the Sarranía Yutajé at the headwaters of the Manapiare, affluent to the Ventuari-Orinoco River systems in northeastern Territorio Amazonas; and, third, the recollection of critical and historical regions of the Alto Orinoco, the Casiquiare, and the Río Negro and the Río Guainía in Amazonas, along the contiguous frontiers of Brazil and Colombia.

In the upper Orinoco, type localities of an earlier New York Botanical Garden expedition were revisited near Cerro Yapacana. Some time was spent in the Esmeralda savannas at the west base of Cerro Duida, an area made famous by the visits of Humboldt, Robert Schomburgk, Richard Spruce, and later by Tate and Steyermark. In the Casiquiare and Ríos Negro and Guainía, collecting routes of Richard Spruce were retraced, where many of the historic species taken by Spruce were recollected. In the upper Cáno Pimichín a newly found savanna brought to the expedition many plants which seemed to suggest a transitory station between the floras of the Guayana Highland and the anciently related floras of the highland to the south of the Amazon Basin.

This report will deal in a preliminary way with the itineraries, work, and collecting results separately of the three phases of the expedition; or, perhaps better termed, the three independent expeditions operated jointly by The New York Botanical Garden and the American Museum of Natural History into Guayana during the period November 23, 1952 - May 18, 1953, and supported largely by the contributions of Mrs. Silas H. Witherbee and H. R. Kunhardt, and by equipment and supplies donated by Sears, Roebuck & Co., Johnson Motor Co., Parke, Davis & Co., and Charles Pfizer & Co.

In acknowledging these generous contributions of drug supplies, a remark may be made about the general problems of health on tropical expeditions. In this part of the world, dysentery and malaria remain the chief perils, but now, equipped with modern drugs, tropical living is almost as safe as that in any temperate climate under the most rigid hygienic conditions. Chloromycetin and terramycin have freed us from the ravages of both bacillary and amoebic dysentery. And that wonderfully effective antimalarial, Camoquin, so generously supplied by my good friend, Dr. Eugene H. Payne of Parke, Davis & Co., has kept us and our Indian helpers consistently free of that debilitating and everywhere-endemic disease, malaria.

The expedition consisted of myself and Dr. John J. Wurdack of The New York Botanical Garden and Mr. Edward McGuire of the American Museum of Natural History. Mrs. Maguire accompanied me.

Departure was made from Marcus Hook, Pennsylvania, aboard the "M. T. Elisabeth Ence," a German tanker chartered by the Sinclair Oil and Refining Company. The party arrived in Puerto la Cruz on December 1, again to have immigration and customs procedures quickly facilitated by the Sinclair office. By January 3 purchases of food supplies had been made for the three phases of the expeditions to follow and truck transportation arranged to Ciudad Bolívar.

In Ciudad Bolívar the facilities of the Orinoco Mining Company were placed at the expedition's disposal, as they had been in the past. Equipment and supplies were apportioned for the remaining phases of the expedition, and preparations readied for departure by plane to Kavanayén in the Gran Sabana.

PART I
The Exploration of Chimantá-Acopán-tepuí

At the Kavanayén Mission, Sta. Teresita de Kavanayén, Padre Victor again received us most hospitably, putting a new house at our disposal and arranging for us to take meals at the Mission during our stay there.

Despite the fact that arrangements had been made at the end of the previous Phelps expedition to Ilu-tepuí for the assemblage of our Indian carriers at Kavanayén to be ready for departure on December 20, we found the Indians preparing for the Christmas fiesta and unwilling to leave the vicinity of Kavanayén. This meant that we would have more than two weeks at the Mission before being able to set off on the exploration of Acopán; so we decided, with the few Indians then available, to make a short excursion to Ptari-tepuí, a mountain previously visited by both the Phelps Ornithological Expedition and Dr. Julian Steyermark of the Chicago Natural History Museum.

Our main camp was set up at the Phelps' "Missie Kathie Camp" at 4,500 feet elevation, lying near the top of the escarpment of the drainage between Ptari-tepuí to the northward and the continuous Soropán-tepuí to the southward. Dr. Wurdack collected the north slopes of Soropán up to the summit at 5,500 feet altitude, while I collected the western slopes of Ptari-tepuí, following the Phelps trail to the upper escarpment at 6,000 feet altitude. Edward McGuire collected mam-

mals in the vicinity of our main camp.

An interesting non-botanical find of the trip was an abundance of small fish in the main mountain drainage at the summit of the waterfalls. This falls and the continuing cataract form a barrier of some seven hundred meters, which must have isolated these fish for geologically a long period of time. It is felt that the fish will be of considerable interest taxonomically, and that their occurrence in this long-isolated stream may have some bearing as to the possible age of the isolation of the mountain top from base level below.

Because of lack of sufficient porters, we had been unable to transport drying equipment to Ptari-tepui. Consequently, it was necessary for Dr. Wurdack and me to depart early December 18, for a rapid trip to Kavanayén to press and dry the entire plant collection.

General collecting continued in the savanna, quebradas, and marshy areas in the vicinity of Kavanayén until Christmas Eve. Christmas day began at midnight with mass at the Mission church, followed by Christmas dinner at one o'clock in the morning. Members of the expedition were guests of the Mission during the fiesta.

Christmas afternoon Capitan Rafael, Chief of the Arecuna Indians of the area, informed us that the men had decided to leave next morning for the expedition rather than wait until the day following New Year. On the next morning, December 26, the Indians began to assemble about our house shortly after daybreak. During the morning we apportioned loads, made last minute arrangements for additional hammocks and provisions for the Indians, and at eleven o'clock began moving carriers out with their loads. Within an hour the entire expedition was under way — sixty-three carriers and the four principals.

Our route led in a southerly direction along an old established Indian trail. The terrain is hilly with a varied plant cover — open grass-sedge savannas and scrub slopes and plateaus are interspersed with dense rain forest filling valley bottoms and covering successively higher hills as we approached the Acopán-Chimantá massif, which shortly Dr. Steyermark was to approach from the west side, thus to complement our work on the east. Camp was made that afternoon along a very pretty stream at the border of a woodland.

In the meantime, Edward McGuire's leg, which had gotten infected, was becoming more painful, and it was decided that he would have to return to Kavanayén and probably to Ciudad Bolivar for treatment. One Indian was sent to accompany McGuire and to carry his immediate personal gear back to Kavanayén. The rest of the party proceeded towards the mountain.

By the end of the third day we had crossed to the far side of the Río Caruai, which flows southward along the east side of Acopán. On the approach no collecting was done but photographic record, both moving picture and stills, was made of the eastern scarp of the many tepuís comprising the massif. During the morning of the third day, from a good vantage point some twenty miles from the mountain, we were able to locate and decide upon the probable route of our ascent. . . .

We made our camp for the evening on the east side of the Caruai, some two or three miles below Casa Pedro Sucre, the head of the group of Indians living in that region of the Caruai. On the morning of December 30, we forded the river about noon, after our River Camp had been set up and the greater number of our Indians had been dismissed. . . .

New Year's Eve was celebrated with singing and a big bowl of rum for the boys. By the evening of January 1, our Base Camp had been set up some three miles from the River Camp. It lay across a succession of three low hills in dense primary rain forest. The next day, January 2, we cut our line upwards to 3,500 feet. On returning to camp, we found that Pedro had delivered only eighteen of the promised sixty tortas of cassava, and that he had sent word that this was all he could supply.

Our porters en route to the mountain had so diminished our rice and cassava bread supply that it was essential that these be supplemented immediately. It was then decided that I should return to Kavanayén, leaving Dr. Wurdack to continue with the exploration of Acopán-tepuí, to be later joined by Edward McGuire in the event of his recovery. It was my purpose to make immediate arrangements for more supplies for the expedition; moreover, my leaving would withdraw still more of the Indian porters from the expedition, thus relieving the daily consumption of supplies then at hand. Accordingly, on the morning of January 3, I proceeded to Casa Pedro on the Caruai. Pedro declared himself to be unable to supply more cassava, since his farms were all new and the old yucca patches nearly depleted.

Midway to Kavanayén we stopped at a village where one of the sons of Pedro Sucre lived, and also a brother of Capitán Rafael. All male members of the village were still carousing in a continuation of the Christmas fiesta. Capitán Rafael's brother promised to deliver two tercios (forty tortas) of cassava immediately to Dr. Wurdack and to provide an ample supply in continuation for the needs of the expedition. Rafael assured me that the cassava would be faithfully delivered. The captain was given in payment for this service a double barrel shotgun, which is of great value in the Indian country.

Back at Kavanayén, on January 6, we paid off the Indian porters who

Ptari-tepui is usually wreathed in clouds

One of the Venezuelan assistants examines a fragrant-flowered member of the madder family

had returned with us, *bolivars* (Venezuelan currency) in payment of wages, and much more prized the *regalos* of pants, shirts, pretty dress-prints, needles, thread, knives and the like, provided to the expedition by the generosity of Sears, Roebuck & Co.

We had now learned of McGuire's intention of immediate return to Kavanayén, so seven men were hired to transport all of his equipment and an additional case of tinned meat and a hundred pound sack of rice to supplement Wurdack's supplies. On the following day, January 7, the plane arrived without Ed McGuire. Arrangements were then made to retain the seven men until the arrival of the following plane, after which, if McGuire still did not come, the men were to proceed with the food and further arrangements were to be made for carriers in the event of his arrival at a later time. Instructions had been given to Dr. Wurdack to break camp on the summit of Acopán in time to arrive in Kavanayén by March 4, at which time a plane from Ciudad Bolivar would pick him up.

Chimantá Massif Expedition

NARRATED BY JOHN WURDACK

The approach to the Chimantá massif was in southwesterly line from Kavanayén, a walking distance of about eighty miles. The first thirty miles (to the Río Caruai near Ruman) was a well-marked Indian trail; the remainder of the trail had to be cut through virgin forest. After establishment of a base camp on the west side of the Río Caruai, Dr. Maguire left for the return to Kavanayén on January 3, and all but fifteen of the sixty-three Indian carriers returned with him.

Seven additional camps were then established en route to Churi-tepuí, the final camp being at an elevation of 6,200 feet, at the base of the lower escarpment of that mountain near the southwest corner. The final camp was reached on January 22; Edward McGuire had rejoined the expedition on January 20.

Arrangements had been made with the Capitán of the Arecuna Indians in Kavanayén for the forwarding of additional cassava, but none was forthcoming; as a consequence, other food supplies on hand were used at an accelerated rate, and return to Kavanayén had to be started on February 5, rather than nearly three weeks later as originally planned. Collecting activities were hampered by the necessity of sending Indians to Kavanayén and intermediate points in futile efforts to obtain more cassava. The broken heavily-forested terrain and heavy rains (twenty inches fell in the ten-day period January 27-February 5) were additional handicaps. A total of three hundred fifty-five numbers (about three thousand specimens) were collected, mostly in large series; of these, one hundred six numbers were from the lower and upper cumbres of Churi-tepuí and the remainder from the upper and lower slope forests of Churi-tepuí and Sarven-tepuí. The highest elevation reached was 7,050 feet, above the upper escarpment on Churi-tepuí.

Kavanayén was reached on February 15. After settlement of all payment and *regalos* with the Indian carriers and the Mission personnel, return was made via plane to Ciudad Bolívar on February 18. Subsequently, with the assistance of the Orinoco Mining Company, collections totalling one hundred seven numbers (about six hundred specimens) were made on Cerro Bolívar. After additional supplies for the Alto Orinco were purchased in Ciudad Bolívar, I departed March 9, joining the Maguires in San Fernando de Atabapo March 15, after passage up the Orinoco River via motor boat and falca.

PART II

The Exploration of Cerro Yutaje

NARRATIVE RESUMED BY BASSETT MAGUIRE

In Ciudad Bolívar we found Ed McGuire quite recovered and ready to return to Kavanayén. On arrival in Kavanayén (I later learned), he found that all of the Indians that had been hired to take him back to the mountain had departed the day before without him. He was able to get only three Indians to accompany him to Chimantá-Acopán to rejoin Dr. Wurdack.

Further provisions had been bought and reservations made for the river trip to Puerto Ayacucho, the capital of Territorio Amazonas, some six hundred miles above Ciudad Bolívar, on the motor ship "Apure" — a very nice little vessel. After more entertaining at Ciudad Bolívar, we went aboard the "Apure" on the evening of January 10 and arrived in Puerto Ayacuchio five days later. Silverio Level had arrived with our falca and motor. We purchased additional gasoline and lubricating oil, more fresh supplies, and were under way by noon. The truck portage to Sanariapo required two hours, so that it was not until three o'clock that we were loaded and embarked on the river at the head of the great falls of the Orinoco. We spent the night on Isla Raton at the farm of Zamba (Eugenio Rodriguez), the second of our former and very dependable field assistants. The following night we had reached San Fernando, one hundred fifty miles up the Orinoco, headquarters of the New Tribes Mission, and final staging point for our work in the Alto Orinoco and Ventuari.

Our friends of the New Tribes Mission were hospitable and helpful, as usual, so that we were able again to divide our supplies and equipment,

leaving that part in San Fernando for the third phase of our expedition into the Alto Orinoco and Casiquiare. With our launch fully loaded and our crew of four, we left San Fernando on January 18.

Passage up the Orinoco and Ventuari and into the Manapiare was rapid. Fish and game were beginning to be plentiful and biting insects very troublesome. The rainy season continued, so we had a wet camp every night.

We arrived at San Juan on the Manapiare on January 24, a distance of some five hundred river miles. It was necessary to arrange for small boats to take our gear and equipment up the small caños in the approach to Cerro Yutaje, to purchase new fresh supplies, and to hire a crew of ten men to act as porters on our exploration of the mountain. We left San Juan the morning of January 26.

That afternoon, we entered the mouth of the Atabapure, where it immediately broadens into a maze and labyrinth of extensive lagoonas, before finally being confined into the single channel leading from the mountain. The vegetation about these lagoonas is largely flooded forest and bears the characteristic swollen trunks of aquatic trees. Game abounds—ducks, geese, large rodents, "cayman" and "baba," and "tigres" (jaguars) — nowhere in South America have we seen such an abundance of wild life. At times the skies would be blackened with the thousands of ducks and geese overhead.

At this point collections began, since material could be kept until we were to reach Base Camp.

It was necessary to establish three camps — our Base Camp at the foot of the mountain on Caño Atabapure, an Intermediate Camp at 3,000 feet elevation, and our summit camp, Yutaje, at 4,500 feet altitude — and some three hundred yards beyond the brink of the lofty Yutaje Falls, more than 1,500 feet high. Camp Yutaje on the summit was established on February 6; there we remained until March 1. During this period much of the summit reaching 7,000 feet high was explored and collected.

Our camp on the summit of Yutaje was one of the most beautiful of any in a long series of explorations. It stood at the junction of two lovely black water streams, under a grove of *Bonnetia* and *Gleasonia montana* (named *Gleasonia* in honor of Dr. H. A. Gleason, a long-time member of the Garden staff), two of the handsomest flowering trees to be found in the Western Hemisphere. Both were in full bloom during our stay.

Departure was made from Base Camp early in the morning of March

Bonnetia, a member of the tea family, abounded on Yutaje

5, and progress down the Atabapure was rapid. Early in the afternoon we were fortunate enough to see and take a female jaguar and to photograph the last part of the hunt.

We reached San Juan on March 6, where we remained the next day to pay off our men again in money and goods from Sears, Roebuck & Co., and to prepare for the further return to San Fernando. We reached San Fernando on March 11 and were joined by Dr. Wurdack on March 14. This phase of our trip had accomplished the exploration of Cerro Yutaje with a collection of some five hundred forty numbers.

Part III

The Exploration of the Alto Orinoco, Casiquiare, and the Ríos Negro and Guainía

From San Fernando we proceeded directly to Caño Yapacana, bordering the botanically rich Yapacana savannas which lie at the northwest base of the mountain itself. We arrived at Yapacana on March 16 and departed on March 20, after very satisfactorily supplementing our 1951 collections. On the Yapacana savannas we encountered the highest temperature yet experienced in tropical America. The shade temperature reached 104°F — the open savanna temperature must have exceeded 130°F.

From Yapacana we proceeded to Esmeralda at the foot of the famous Cerro Duida, which had been visited by Humboldt, Bonpland, Schomburgk, and Spruce, and later by Tate of the American Museum, who was the first to ascend the mountain, and more recently by Dr. Steyermark of the Chicago Museum. Considerable good material was obtained at Esmeralda, including many topotypes; and in spite of the visits of previous collectors, we were able to find some new things. Esmeralda has gained the reputation of having the most persistent plague of biting insects of any place in South America. It lived up to this reputation on the occasion of our visit.

From Esmeralda we proceeded up the Orinoco almost to the final point of navigation, into the country of the Guaika Indians, the most primitive in Venezuela and, perhaps, in South America. The sole purpose of this visit was to obtain a photographic record of this interesting people.

By April 1 we had descended the river to the point of its bifurcation, which is the source of the Río Casiquiare, a tributary of the Río Negro, which is itself one of the principal affluents of the Amazon River. Collecting on the Casiquiare, made famous by the botanical work of Richard Spruce, and in the principal tributaries of this stream, the Ríos Pacimoni, Siapa, and Paciba, occupied us through April 8. That afternoon we passed into the Río Negro and proceeded down to División, a small settlement at the Brazilian frontier.

Two days at División were spent in climbing and collecting the curious granitic boss some 1,000 feet high named Cucuy. Here again we obtained ample material, much of it of considerable historic importance. From División we proceeded upstream again and into the Río Guainía, collecting from the river-banks while in progress. Since the Venezuelan and Colombian borders alternate at regular intervals, first the frontier being on the left bank and then on the right, considerable of our collections from this three hundred mile stretch of the river was actually made in Colombia.

(Continued on page 192)

Rambles of a Botanist in Florida

By **Anne E. Perkins**

I SPENT twenty winters, six months each, and part of another winter botanizing in Florida. Before going there the first time, I obtained information as to the best sections to botanize from the late Dr. John K. Small, the late Mary Francis Baker, and others. They recommended the Florida Keys, the section about Bradenton-Sarasota, the sandy portions near Lake Wales and Sebring, the stretch from Apalachicola — and I found them profitable areas.

Mary Francis Baker, in her book, FLORIDA WILD FLOWERS, says that "a chief delight of the flower hunter in Florida is that each day in the year something of interest may be found, in winter as well as in summer. No other part of our country can show so great a variety in its wild flowers, and in no other state are there so many plants of strange habits and remarkable characteristics." More than three thousand species of flowering plants have already been listed as growing in Florida, and this vast number does not include the many cultivated plants. Florida has been a foster mother to many introduced plants escaping from cultivation to become established in nature.

Many of the flowers of Florida are small, often not seen when driving along the highway, especially at sixty miles an hour, but all winter there is some bloom, even on vacant lots and along roadsides, for there is no fixed season in Florida, no hurry to mature and set seeds as in the North.

The leaves are generally persistent on trees and shrubs. Many are thick, leathery, fleshy, glossy, entire, small — adaptations to dry conditions — as they have to do duty for two or three years. The leaves of the sea-grape *(Coccoloba uvifera* of the buckwheat family) and the seaside morning-glory *(Ipomoea littoralis)* along the beaches are examples of the thickness of the leaves, while the magnolia is an example of very glossy leaves. Leaves must be able to endure not only dry seasons, but to shut out drought and resist insects; if tender, thin, and dissected, they would not endure so well. A few trees and shrubs shed some or all of their leaves in January and February as, for instance, the willow and the maple, but leaves usually fall more during the seasonal rains.

In variety of size Florida has "the great magnolia whose perfumed flowers are larger than one's hand, and the tiny wolffia, the smallest of the known flowering plants, whose entire growth floating in water is smaller than the head of a common pin." A striking thing is that in some places a shrub may become quite a large tree and many shrubs may also sprawl and climb like vines.

Then there are air plants, epiphytes, on palmettos, live-oaks, even on telephone wires. Many of the ferns and orchids are epiphytes growing on trees, the orchids usually with a bulbous base storing up a supply of food. Air plants collect some water and food at the bases of their thick leaves. Four common air plants are readily distinguished; one when about to bloom presents such brilliant red bracts, like the pineapple, that the visitor might mistake them to be the flowers instead of the spike of insignificant blue ones.

There is a transition zone in the north of Florida where northern flowers mingle with the abundant southern flora, and in the country below Miami there is a tropical flora related botanically to the West Indies rather than to the United States. The flora of the Keys is so absolutely different that it is described in a separate book. Four hundred forty plants are found on the lower Keys, two hundred sixty-five on the upper Keys, and there are fifteen hundred flowering plants in lower Florida.

"The great diversity of soils, often in a limited area, gives rise to a remarkable variety in the flora. From high pine land to marsh and sandy shore to swamp, each change in the character of the soil is shown in the different plant associations." In low pine lands delicate atamasco lilies spring from the forest floor. On dry hills grow blue lupines and pink wild buckwheat and rosemary. The great magnolia is at home in the hammocks. In swamps where cypress trees assume fantastic forms, and where crimson spikes of air plants, "poor relatives of the pineapple," flame from the trees, grow delicate, incredibly beautiful white spider lilies and crimson lilies, wild calla, spoon flower *(Peltandra sagittaefolia)*, golden-club *(Orontium aquaticum)*, St. John's lily *(Crinum americanum)*, southern Jack-in-the-pulpit, water arum, pickerel weed.

On the ocean shore grow morning-glory, seaside portulaca, sea lobelia, sea rocket, bay cedar *(Suriana maritima)*, saltwort *(Batis maritima)*, bumelia, and Florida privet *(Forestiera porulosa)*. Along the Keys are thousands of dwarf sunflowers, different cacti, huge thistles, pink and white poor man's patches *(Mentzelia floridana)*, woe-vine *(Cassytha filiformis)* like yellow yarn, yuccas, wild papayas, elder, prickly ash, marlberry *(Icacorea paniculata)*, myrsine *(Rapanea guayanensis)*, saffron plum *(Bumelia angustifolia)*, smilax, sabattia, and red sage.

The abundance of the individual plants of a species is often as striking as the variety — ponds yellow with bladderwort, acres blue with iris, marshes pink with sabattia or sea-star. Pipeworts are myriad and beautiful, milkworts are abundant as is the fragrant penny royal, not like our northern. From January on the numbers of flowers increase if rain and sun foster their growth.

Noticeable flowers along the roads are polygalas, forty-one species; crotolaria, ten species; eupatorium, forty-three species; hypericum, thirty; lobelia, twenty-two; rhexia, pink and ephemeral, perhaps six; goldenrod, perhaps eight — these are unlike our northern goldenrods, they are fine and flat; passiflora, two species; and several of ricinus, the castor oil plant. Farther down the state the strangling fig is a noticeable feature of the landscape; there are particularly good

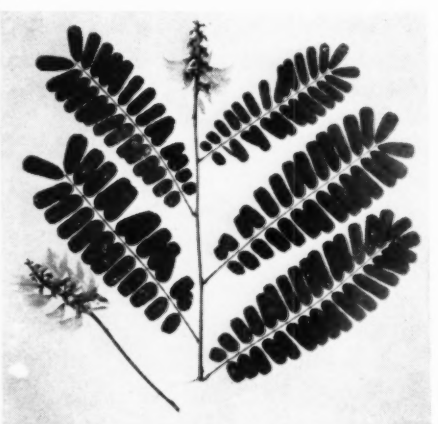
specimens at Sarasota, Siesta Key, and near the jail at Ft. Meyers.

Some northern plants fled before oncoming glaciers and became a permanent part of Florida's flora. At least seventy-five species in lower Florida also range north to and beyond the fortieth meridian and then into Canada. The coontie (genus *Zamia*) is one of the survivors of pre-glacial days — not that there were glaciers in Florida. This plant, named by the Seminoles "Conti hateka," is also known as comfort-root and white bread plant because of its starchy underground stem. It was the main source of flour for Florida aborigines and Seminoles and now furnishes white men with arrow root. This is the oldest and most primitive living seed plant and even has some characteristics of ferns, cabbage, and saw palmettos, being pre-glacial.

One notes such old friends as the royal fern, the most widespread of ferns on the continent, and the cinnamon fern *(Osmunda regalis* and *O. cinnamomea),* the marsh fern *(Thelypteris palustris),* pickerel weed or *Pontederia,* the blue toadflax *(Linaria canadensis,* as well as *floridana,* an intermediate), the black-berried elder which seldom fruits in winter, the woodbine or ampelopsis, and the dwarf sumac or *Rhus copallina.* Very few mustards are found, as this is essentially a northern family. The Jack-in-the-pulpit may be seen, that is, the southern type, *Arisaema Dracontium,* usually called the dragonhead. Both cattails and the common bulrushes, Venus' looking-glass *(Specularia perfoliata),* the buttonbush *(Cephalanthus occidentalis)* which is "a Yankee in Florida," and the partridge berry *(Mitchella repens)* are also to be found, as is "pusley" *(Portulaca oleracea),* which, however, is not as common as it is in the North. The white flowered, ubiquitous beggars' ticks *(Bidens leucantha)* does not seem quite as annoying in sticking to one's clothes as it does in the North. In ditches I found the pretty azolla, a tiny water plant allied to ferns — it is not too common — and also salvinia and lycopodium. Our own orchids, pogonia and calopogon, are fairly frequent and also a number of species of limodorum, resembling the latter.

Obviously, I cannot enumerate every plant I have observed while botanizing in Florida. I must mention one plant, however, the attractive crab's eye vine or rosary-bead *(Abrus precatorius)* with its bright red seeds, capped with black at one end, remaining in the open pods. These seeds have long been used for Buddhist rosaries and as a standard of weight in India — the weight of the famous Kohinoor diamond was so determined. The late Dr. H. H. Rusby told me the fresh seeds are poisonous and used by South American Indians as arrow poison.

Ditches and ponds are over-run by the water-hyacinth *(Eichhornia crassipes)* dubbed the "million-dollar weed," because its accidental introduction has cost Florida millions in trying to eradicate it. It has interfered with navigation on the St. John's River and elsewhere. Beautiful as an orchid, pale blue or with a pinkish shade, the water-hyacinth covers streams till no water is visible; the streams appear like green lanes from which masses of plants become detached and float away, thus spreading. The plant, though a water plant, readily adapts itself to muddy shores as along the Miakka River, rods from the water itself, where it lengthens its inflated globular leaf stalks. These leaf stalks act in the water as air-filled floats.



Rosary bead, *Abrus precatorius,* has long been used in India as a standard of weight

Whether the water-hyacinth is native to the state or was introduced from the tropics by being thrown into the St. John's River from an aquarium has long been in dispute. Undoubtedly it has been cultivated, even if a native plant.

For years the water-hyacinth was not only a barrier to transportation of many of Florida's lesser rivers, but by slowing the flow of water so that streams became stagnant, the plant provided a breeding place for noxious growth, both vegetable and animal, and a lurking place for reptilian life. It was a menace to the health of inhabitants along the waterways it infested, and except for the beauty of its bloom, a major nuisance.

The office of the District Engineer, Jacksonville District, Corps of Engineers, U. S. Army, "has been engaged in the control of the water-hyacinth for many years. Several mechanical methods were employed, usually in the form of a mechanical conveyor which would physically lift the plant from the water for disposition elsewhere.

"In the 1930's, a 'destruction boat' was developed which employed banks of fast rotating saws similar to those used in cotton gins. The boat was propelled into the floating mass of water-hyacinths and the saws shredded the plants. This was the most effective mechanical tool ever developed and served with satisfaction for a number of years.

"With the advent of 2,4-D, a far more efficient and economical method of control became available. Spray operations (from land, boat, and plane) have now completely replaced all mechanical methods."

When visitors see the beautiful butterworts, exquisitely blue, vividly yellow, in great profusion, few of them realize that they are buttery and greasy in order to collect insects as part of their food. Literally acres also of the round and narrow-leaved sundews may be found. Everyone, of course, notices lupines and the orange and pink lantanas, the showy "red locust" or sesbania, now freely naturalized, and the vivid red of Cherokee beans; but few know the leaves of the latter, coming later, nor the sweetness of the saw-palmetto blossoms surrounded by bees, nor that the so-called century plant may send up a flower spike measuring over forty-two feet, eight inches, and growing at the rate of two feet a day.

Many ask if I do not fear rattlesnakes and moccasins when I am botanizing in Florida. There are, of course, rattlers in Florida as there are in New Jersey, Pennsylvania, and other states; but by being alert and looking where one steps, there is really little danger. There are harmless snakes in

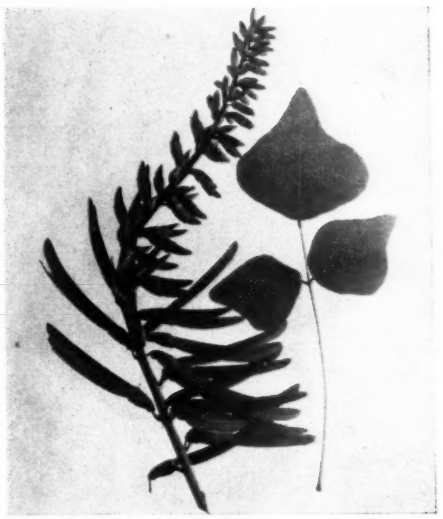
plenty, such as king, pilot, black, chicken, water; but in twenty winters of botanizing in nearly all sections of Florida, I have seen only one live rattler and that one small and from the car. Not that one is justified in being careless and disregarding danger, but there is no need of exaggerating danger to the extent that one is deprived of pleasure. Dr. A. J. Grout, foremost authority on mosses, who had studied in Florida for many years, told me he had not met any rattlers.

We both agreed that the red bug or "chigger" was a far greater anxiety. It is microscopical and burrows under the skin. Strange to say, the chigger never touches some people — many natives are not bothered by it, neither are negroes. The lesions swell like a poisonous bite, itch and burn intolerably. Removal of clothes and a hot, soapy bath is advisable after a trip in grass and bushes — and all these clothes are not to be resumed until washed or thoroughly brushed. After many experiments with preventives and applications to bites from ether, chloroform, camphor, kerosene, collodion, and salted grease, I found that powdered sulphur dusted in hose and underwear prevented attacks and, in case no protection had been undertaken and the insect had made entrance under the skin, an application of household ammonia, undiluted, to the bite, gave relief, as did calamine lotion. This little jingle arouses a responsive feeling in the breast of sufferers from chigger bites:

"Here's to the chigger
That ain't no bigger
Than the point of a small-sized pin;
But the bump he raises
Itches like blazes—
That's where the rub comes in!"

The visitor to Florida should be properly clad for botanizing, as in many places it is wet and also there are many prickly, thorny, or spiney shrubs and vines that tear delicate clothing — cacti, yucca, pull-back vine, for example. The wicked sand-spurs and sand-burs attach themselves to clothes and skin and often cause painful sores. Anyone who is going to Florida to botanize would do well to write Walter Buswell, University of Miami, at Coral Gables, and to the Department of Botany at Gainesville. Buswell was Thomas Edison's botanist and has identified many plants for me. Advice may also be had from some of the many books on Florida plants, including

Small, John K.:
FLORA OF THE SOUTHEASTERN UNITED STATES; FERNS OF FLORIDA; FERNS OF THE SOUTHEASTERN STATES; FLORIDA TREES. A HANDBOOK OF NATIVE AND NATURALIZED TREES OF FLORIDA; SHRUBS OF FLORIDA; MANUAL OF THE SOUTHEASTERN FLORA; CAPE SABLE REGION OF FLORIDA; FERNS OF ROYAL PALM HAMMOCK; FERNS OF TROPICAL FLORIDA; FLORA OF MIAMI; FLORA OF THE FLORIDA KEYS.



The vivid red of the Cherokee bean is familiar to many visitors to Florida

Hitchcock, A. S.;
MANUAL OF THE GRASSES OF THE U. S.

Baker, Mary Francis:
FLORIDA WILD FLOWERS.

Torrey, Bradford:
A FLORIDA SKETCH-BOOK.

Packard, Winthrop:
FLORIDA TRAILS.

Simpson, Charles Torrey:
FLORIDA WILD LIFE; OUT OF DOORS IN FLORIDA; IN LOWER FLORIDA WILDS.

Bartram, William:
TRAVELS THROUGH NORTH AND SOUTH CAROLINA, GEORGIA, EAST AND WEST FLORIDA, THE CHEROKEE COUNTRY, THE EXTENSIVE TERRITORIES OF THE MUSCOGULGES OR CREEK CONFEDERACY, AND THE COUNTRY OF THE CHOCTAWS.

Howell, Arthur H.:
FLORIDA BIRD LIFE.

Longstreet, R. J.:
BIRD STUDY IN FLORIDA.

Fruitful botanizing grounds are abundant after late January or February, but not until February does one find much except in lower Florida. About the time most tourists leave Florida the botanizing grounds are at their best; April and May are really the best months for both plants and birds. At any time plants may be found in the Miami region and the upper and lower Keys, but in the more northerly sections March and April are desirable months. Along the Tamiami Trail, especially at its lower end, is a fine area for botanizing. The Bradenton - Sarasota - Arcadia section is also excellent. Such islands as Marco and Sanibel and the various Keys near Sarasota have much to offer, and the Ridge district around the lakes and sandy areas offers great variety.

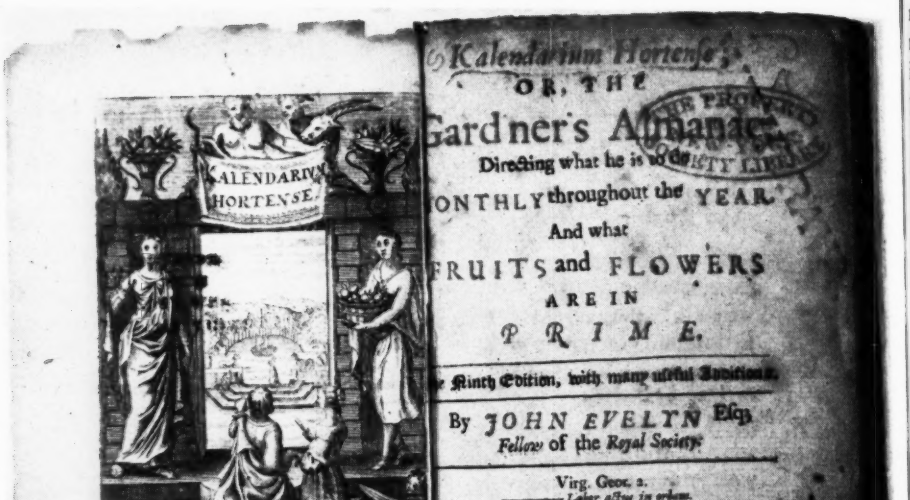
The east coast of Florida differs from the west coast in its flora. One may secure beautiful mallows there, little spotted pitcher plants, and different papaws. De Leon Springs and the territory north of Ocala have many interesting plants, and Royal Palm Park on Paradise Key is a bonanza. So is Key West with the Keys leading to it, notably Big Pine Key. The Fern Grotto has about two dozen ferns, some of them very rare. It is claimed that the grotto is on the site of what was once a tropical island washed by the Gulf Stream. I visited it in company with the St. John brothers, by advice of Mrs. Baker (the late Mary Francis, who was stone deaf but very active). The St. John brothers, retired teachers of Floral City, who specialized in ferns, had much to do with the last edition of Small's FERNS OF FLORIDA.

Anyone interested in ferns should visit Ft. Marion at St. Augustine and see the *Cyrtomium falcatum*, one of the so-called "holly-ferns," growing there. This is native of Asia, the Pacific Islands and Africa, escaped from cultivation in Florida.

Highland Hammock, preserved by Mrs. John Roebling, also offers much; and it has its own resident botanist. I had permission to collect there and also on Paradise Key, saved by Florida club women and now part of Everglades Park.

At Captiva Island and Bonita Springs one finds the curious seven-year apple, *Casasia clusiifolia*. Care should be taken to avoid poisoning from the coral sumac *(Mitopium toxiferum)*, a shrub in the rhus group so common in the Keys; it has extremely irritating sap.

(Continued on page 186)



Frontispiece and title page of the *Gardner's Almanac* by John Evelyn

Notes from CLARENCE LEWIS' LIBRARY

Old Garden Books and Their Authors

Part II

By **H. W. Rickett**

NEARLY a century later another gentleman, the illustrious John Evelyn, was writing on an even greater variety of subjects. He was born at Wotton in Surrey in 1620. To the England of the Virgin Queen had succeeded the turbulent time of the Stuarts; but meanwhile the small germs of natural science of Elizabethan England had grown and flowered into the Royal Society. Evelyn was instrumental in founding the Royal Society and was a member of its Council from the beginning; later he was its Secretary. Coming of an old family, it was natural that he was attached to the fortunes of royalty; yet he somehow managed to stay on good terms with Cromwell and the Parliament during their term of power — partly by keeping out of the way. Shortly after the outbreak of the Rebellion, disgusted by the confusion in London, Evelyn went abroad and was away from England (though not continuously) about nine years (1643-1652). (I follow the biography prefaced to the 1879 edition of Evelyn's *Diary*, by Henry B. Wheatley; different accounts are not in agreement on some details.) These years of travel laid the foundation for the remarkable breadth of his culture. It was during this period that his first published work appeared, a translation from the French entitled *Liberty and Servitude* (1649).

When he returned to England, he wanted nothing better than to live a retired life on his estate at Deptford; he was studious by nature and devoted also to horticulture. But the prospect of a return of the monarchy impelled him to take part in political life; his pamphlets in the royalist interest played their part in the Restoration. In spite of his own sobriety, he was much at the dissolute court of the second Charles and enjoyed the friendship of the monarch. He was appointed Commissioner for reforming the buildings, ways, streets, and incumbrances and regulating hackney coaches in London. He was Commissioner also for regulating the mint and for the repair of St. Paul's Cathedral (shortly before it burned in 1666). One of his most arduous offices was as Commissioner for the care of the sick and wounded in the war with the Dutch. He laid the first stone of the Greenwich Hospital in 1696 and was later appointed its treasurer.

During all these activities he managed to find time for many writings, which extended from political science to such topics as the smoke which was even then annoying London, to architecture, engraving, the Jesuits, commerce, the study of medals, painting, soil, and gardening and forestry. His first essay in horticulture was a translation of Nicolas de Bonnefons' *Le jardinier françois* of 1651 [see the Catalogue of the Library of the British Museum (Natural History), p. 617; also Fussell, p. 66], under the title *The French Gardiner: instructing How to Cultivate all sorts of Fruit-Trees, and Herbs for the Garden: together with directions to dry and conserve them in their Natural: An accomplished Piece. Written Originally in French, and Now Transplanted into English.* This was published in 1658; the translator concealed himself under the pseudonym "Philocepos." We have in the library the third edition, carrying Evelyn's name on the title-page, "Printed by S.S. for Benj. Tooke at the Ship in St. Pauls Church-yard" in 1672. It is a small volume of 366 pages measuring 14 × 9.5 cm., bound in possibly contemporary calf, in bad repair. It contains also "The English Vineyard vindicated by John Rose Gardiner to His Majesty at His Royal Garden in St. James's," to all intents a separate work with its own title-page and pagination; this is followed by a discussion entitled "The Vintage" by Evelyn; together an effort to

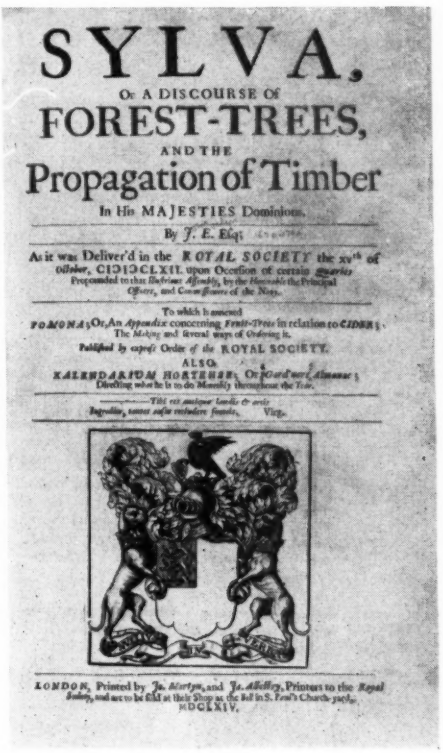
restore the growing of vines and the making of wine to the ancient prosperity which tradition assigned to these pursuits in England. [According to Fussell (p. 66), *The English Vineyard vindicated* appeared separately in 1663. Rohde (p. 128) lists four subsequent editions of *The French Gardiner.*]

In 1661 he presented his *Fumifugium: or, The Inconvenience of the Aer, and Smoake of London Dissipated together with some Remedies humbly proposed.* . . . Much of this is a denunciation of the meanness and irresponsibility which could allow the profit of a few to interfere with the happiness and health of the many. Breweries and factories were allowed to pour out "that Hellish and dismall Cloud of Sea-Coale . . . so universally mixed with the otherwise wholsome and excellent Aer, that her Inhabitants breathe nothing but an impure and thick Mist, accompanied with a fuliginous and filthy vapour, which renders them obnoxious to a thousand inconveniences, corrupting their Lungs and disordering the entire habit of their Bodies; so that Catharrs, Phthisicks, Coughs and Consumption, rage more in this one City, than in the whole Earth besides." His remedies were two simple measures: planting of sweet-smelling native shrubs (he speaks of the odor of roses in Paris, of orange-blossom in Genoa, and of rosemary many leagues off the coast of Spain); and what we should now call a zoning law, to restrict the factories to certain districts distant from residences. That we all, in London and elsewhere, still struggle with this nuisance ("sea-coale" now partly replaced by the fumes of burned petroleum) is perhaps evidence of the preeminence of the profit motive over considerations of health and good living. The little book was reprinted in 1772 (with a renewed appeal on the part of the editor), and again in Manchester in 1930. A facsimile reprint of the 1772 edition was issued in 1933 and was used for the quotations above.

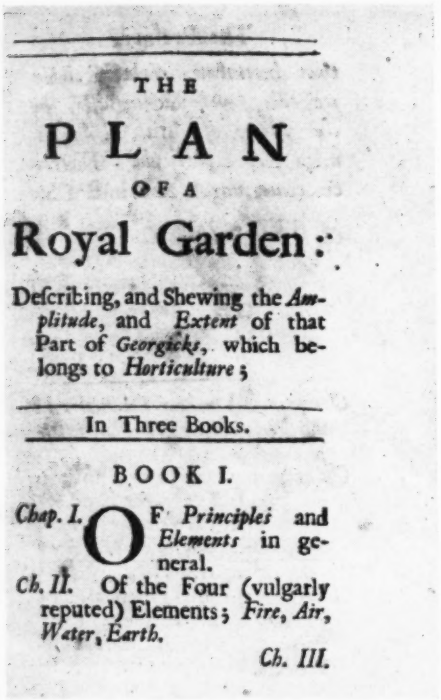
Evelyn is perhaps best known for his *Sylva, or a Discourse of Forest-Trees, and the Propagation of Timber in His Majesties Dominions*, which was "Deliver'd in the Royal Society the xvth of October," 1662, and "Printed by Jo. Martyn, and Ja. Allestry, Printers to the Royal Society" in 1664. The wars had depleted England's timber, and apparently no steps were being taken to replace it; and on timber the safety of the realm largely depended. The *Sylva* is a plea for reforestation and the proper management of the forests, with detailed instructions for culture, felling, seasoning, and so forth. It is well written, well organized, and obviously represents both careful scholarship and wide observation; numerous editions were published. We have in the library a good copy of the first edition, containing 233 pages measuring 31×19.5 cm. and bound in old red morocco finely decorated; also copies of the editions of 1670, 1679, 1706, 1776, 1786, and 1812. Such a long life testifies that the work was of interest to other than bibliophiles.

The *Sylva* proper occupies 120 numbered pages of the first edition. It is followed by "Pomona, or an Appendix concerning Fruit-Trees, in relation to Cider, the Making and several ways of Ordering it." This has all the appearance of a separate work, but is regularly bound in with the Sylva. It runs to 50 pages. The preface contains a plea for the manufacture of this native liquor, with side-glances on the dietary preferences of Englishmen. Then follow chapters on the seeding of apples and pears, on grafting, pruning, and other cultural methods. Evelyn's botanical ideas show some anticipation of the Linnaean teaching of the following century: "A kernel [seed] taken from any graffed [grafted]-Apple, as Pepin, Pear-main, &c. does most naturally propend to the wildness of the Stock on which 'twas inserted, as being the natural mother of the kernel, which is the very heart of the Apple. . . ." Seeds should therefore be gathered from wild stock. Graft-hybridism was a recognized principle; he accepted also the application of rosemary, gillyflowers, etc., to the soil as a means of influencing the taste and odor of the apples. But he comes nearer the truth — following his own observation — when he says that there is more hope of variation in the seed itself than as a result of such methods. Then come "Aphorisms concerning Cider; by Mr. Beale," "Sir Paul Neil's Discourse of Cider" (containing some very ingenious and complex theories of fermentation), and "Observations Concerning the Making and Preserving of Cider: by John Newburgh Esq." All this composes 50 pages.

Title page of *Sylva* for which work John Evelyn is perhaps best known


SYLVA,
Or A DISCOURSE Of
FOREST-TREES,
AND THE
Propagation of Timber
In His MAJESTIES Dominions.
By J. E. Esq;
As it was Deliver'd in the ROYAL SOCIETY the xv^th of October, CIↃIↃCLXII. upon Occasion of certain Queries Propounded to that Illustrious Assembly, by the Honorable the Principal Officers, and Commissioners of the Navy.
To which is annexed
POMONA; Or, An Appendix concerning Fruit-Trees in relation to CIDER; The Making and several ways of Ordering it.
Published by expreſs Order of the ROYAL SOCIETY.
ALSO,
KALENDARIUM HORTENSE; Or, Gard'ners Almanac; Directing what he is to do Monethly throughout the Year.
LONDON, Printed by Ja. Martyn, and Ja. Allestry, Printers to the Royal Society, and are to be Sold at their Shop at the Bell in S. Paul's Church-yard, MDCLXIV.

Finally the volume includes one of the most famous of Evelyn's works, the *Kalendarium Hortense: or, the Gard'ners Almanac; Directing what He is to do Monethly, throughout the Year.* This was also issued separately and went through ten editions by 1706 (Rohde, p. 129. We have several of these in the library, two dated 1699 and one, the tenth, 1706; besides those included in later editions of the *Sylva).* Evelyn is identified on the title-page of his *Acetaria* simply as "J. E. S. R. S. [Secretary of the Royal Society] Author of the Kalendarium." This seems to be the first appearance of a device which has enjoyed a deserved popularity from that time to the present — the arrangement of instructions to the gardener chronologically. Some have denied Evelyn the priority in this invention on the basis of Bacon's essay *On gardens;* but in this we find merely a catalogue of what is in flower or fruit in each month through the year; there are no cultural instructions. It is true, however, that old Thomas Tusser had some-



THE

PLAN

OF A

Royal Garden:

Describing, and Shewing the *Amplitude*, and *Extent* of that Part of *Georgicks*, which belongs to *Horticulture*;

In Three Books.

BOOK I.

Chap. I. OF *Principles* and *Elements* in general.

Ch. II. Of the Four (vulgarly reputed) Elements; *Fire, Air, Water, Earth.*

Ch. III.

Page from *Acetaria. A Discourse of Sallets*, Evelyn's last work

thing very much like the "Kalendarium" in his *Five Hundred Points* of 1573.

In 1665 there appeared in Paris the poem *De hortorum* by the celebrated René Rapin. The second book of this was devoted to "the grove"; and Evelyn quotes it at several places in the second edition of the *Sylva* (1670), with his own translations. In 1673 a complete translation of the poem was published; this was the work of Evelyn's son, also named John, but has often been mistakenly ascribed to John Evelyn senior. The latter included the entire translation in the third edition of the *Sylva* (1679; p. 276), where the authorship is made clear.

During his residence at Sayes Court in Deptford, he wrote out a book of instructions and notes for his gardener; this was not published until 1932, when it was edited for the Nonesuch Press by Geoffrey Keynes. It is entitled *Directions for the Gardiner at Says-Court but which may be of Use for other Gardens.* (Our copy is the gift of Mrs. J. E. Spingarn.) It is devoted largely to lists of the trees planted in various places ("in the Great-Court, in the Fountaine-Garden, in the Green-house Garden, in the Bowling-Greene," etc.), and contains somewhat fragmentary notes on culture. It includes part of what was later published in the *Acetaria,* and a small calendar, "The Gardiners seasons"; also "Termes of Art used by learned gardners" — the earliest such glossary I have found in the old gardening books. (Evelyn's earliest-published glossary was a brief list of words whose meaning might not be at once apparent to the "meaner capacities" in an "Advertisement" of the third edition of the *Sylva.)* Sayes Court was famous for the gardens which Evelyn created there. Charles II visited them; Peter the Great of Russia had a lease of the place during his stay in England and did much wanton damage to the plantings.

In 1693 Evelyn brought out his translation of Jean de La Quintinye's well-known *Instruction pour les Jardins fruitiers et potagers* (1690) under the title *The Compleat Gard'ner; or, Directions for Cultivating and Right Ordering of Fruit-Gardens and Kitchen-Gardens.* . . . Comparison of the two versions shows that of Evelyn to be a competent and nearly literal translation. *The Compleat Gard'ner* is a small folio, beautifully printed, the title in red and black and faced with a fine engraving of La Quintinye, and containing a number of small engravings depicting the polite and formal gardens of the period, and some folded charts showing tools, grafts, pruning, and so forth. The work lived up to its English title; it must have been the most complete manual of horticulture published up to that time. It included "The Dictionary. An Explication of the Terms of Gard'ning, in an Alphabetical Order." I choose a few definitions at random as illustrating the language and the ideas of the time:

"Cuckows, are Straw-berry Plants that blow without bearing.

"To Coffin themselves, is said of Flowers that shrivel up and dry away in their Buds without flowing [*sic*] or spreading.

"Ear-Wigs are an insect well known.

"Rame and Ramberge, are terms used of Melons, when instead of a pleasant, they have a stinking and filthy taste contracted from the neighbourhood of some stinking Weeds, or being too near the Dung, the same happens to hasty Asparagus from the Hot Bed.

"A tendrel, is a young tender shoot of a Vine or other Fruit-Tree that is not yet hardened or grown Woody."

There is also a gardener's calendar (p. 148-172); La Quintinye had invented this independently, or had been quick to adopt it from Evelyn's *Kalendarium.* At the end of the "Dictionary" appears the following advertisement: "The best Pruning-knives, and other Instruments for Gard'ning, made according to the Directions of Mounsr. de la Quintinye when last in London, are Sold at Mrs. Gillyflowers a Toy-Shop, next to the Kings-Bench in Westminster-Hall the Corner-Shop." The lady with the floral name was perhaps related to "Matthew Gillyflower, at the Spread Eagle in Westminster-Hall," who printed the *Compleat Gard'ner.* In his own "Advertisement" Evelyn acknowledges his indebtedness to "Mr. George London (Chief Gardner to their Majesties) and his Associate Mr. Henry Wise," who were in charge of Brompton Park near Kensington. These two persons brought out several abridged editions of the work; we have the fifth edition of 1710 and the sixth of 1717. *The Compleat Gard'ner* was evidently popular.

Evelyn's last work, a copy of which I found in Mr. Lewis' library, was *Acetaria. A Discourse of Sallets,* printed in 1699 "for B. Tooke at the Middle-Temple Gate in Fleetstreet." In this year Evelyn came into possession of the family estate at Wotton, and retired there; he was aged 79 years. "Sallets" are of course salads; but what a difference between the seventeenth-century salad and our pallid and greasy mixtures! Evelyn in fact apologizes for devoting a book to such "luxuries." When I was very young, it was the business of the head of the house to mix the salad; he stood at the head of the table with appropriate dignity and added his oil and vinegar, pepper and mustard and I know not what else, and then chopped and stirred until a salad was born; while the family waited reverently. In Evelyn's day the business started with the planting of the ingredients, which might be almost any "Roots, Stalks, Leaves, Buds, Flowers, &c." These were artistically selected so as to blend their tastes and their virtues: ". . . in

(Continued on page 180)

REGINALD FARRER --

Intrepid Plant Explorer

By R. H. Briggs

As HALLS go in England, Ingleborough Hall is a comparatively small place and would not either on account of its spaciousness or for any architectural features it possesses be considered worthy of a pilgrimage; but it looms large in the eyes of all true lovers of alpines, for it was the birthplace and home of that intrepid plant collector, Reginald Farrer, who did so much to enrich our knowledge of and our gardens with floral gems from far-off lands and ultimately laid down his life in pursuit of them.

The Hall is situated at the foot of Ingleborough Mountain, which dominates the fertile plains below and is a prominent landmark for miles around; it stands abruptly from the limestone crags which are a feature of the district and its greyish white rock contrasts pleasantly with the verdant pasture land over which roam many sheep. The view from the summit of these crags and from the mountain particularly is one of grandeur, not the awe-inspiring kind usually associated with the alpine scenery, but one of pastoral and tranquil beauty. There are snug hamlets, each with its turreted church, the rooftops patterned with moss and lichens, and farmsteads and pastures through which the river Ribble winds its tortuous way like a silver thread to the sea beyond.

Above. Ingleborough Hall, Clapham, the birthplace of Farrer

Left. Outcropping limestone is a feature of the hills in west Yorkshire. Ingleborough can be seen in the background

Although Reginald Farrer is best known by his plant explorations in and his writings on the alpine regions of Europe and Asia, it was not there that his passion for collecting plants developed. This deep interest began when as a young man armed with haversack and collecting kit he scaled the crags and mountains that lay almost at his very doorstep. As Farrer suffered poor health, he was educated at home and allowed to indulge in his hobby — perhaps more from the point of view that the outdoor life would be beneficial to him than with any thought that his plant collecting would one day bring him fame.

Fortunately for Farrer he was born and brought up in a district botanically rich in plants, especially alpines, which had a fascination for him; for example, the gem of English flora, *Primula farinosa*, growing in profusion on Ingleborough Mountain and the neighboring hills, Whernside and Penygent, which he knew equally well. Had *Primula farinosa* come from China or Tibet, it would doubtless have been hailed as a rare plant discovery; its very prolificacy in these English mountains, however, militates against its receiving the honors its dainty form and grace deserve.

In the FLORA OF WEST YORKSHIRE, F. Arnold Lee enumerates over eight hundred plants and describes the Farrer district as the richest in that part of the country from a botanical viewpoint, and of all the treasures of the mountainous areas Farrer found *P. farinosa* and *Saxifraga oppositifolia* of greatest appeal.

It has been said that Farrer exaggerated the beauty of many of his plant discoveries. In fairness, on the other hand, it should be said that when he saw them in their native habitats they were all he described them to be. Many plants, to be sure, when transplanted to an alien district and soil, are known to show a marked variation from the type.

Farrer adopted the Buddhist faith and it did give him access to and some degree of protection in a country that would otherwise have been difficult to penetrate. He vigorously defended his choice of religion in his book, ON THE EAVES OF THE WORLD — it was not an

act to serve him in his plant exploring trips into little known areas.

However, the villagers of his native Clapham received the news of his defection from the "faith of his Fathers" with great dismay. His adoption of so "heathenish" a faith was a severe shock to people parochial in circumstances and outlook and his name was one to be forgotten. Thus any attempt to draw forth information about Farrer's early life from the old inhabitants of Clapham only causes them to wince as though one were probing a particularly nasty wound.

Though the names of many of his forebears are engraved on the tombstones in the churchyard of his home village of Clapham, Reginald Farrer's name is not among them. He died in the wilds of Upper Burma at the early age of forty, having subjected his frail body to hardships and physical discomforts which would have taxed the strength of a strong and healthy man. A simple cross by the pathside marks his last resting place.

In his rock garden on the grounds of Ingleborough Hall, his mother erected a memorial to him on which is inscribed:

In loving memory
of
Reginald John Farrer, eldest son of
James Anson and Elizabeth Farrer of
Ingleborough,
Born February 17, 1880, Died at Nuitadi, Upper Burma,
October 17, 1920. Buried at Kaunghlanghpi, Upper Burma.
He died for love and duty in search of
rare plants.

CLARENCE LEWIS' LIBRARY **(from page 178)**

the Composure of a Sallet, every Plant should come in to bear its part, without being over-power'd by some Herb of a stronger Taste, so as to endanger the native Sapor and Vertue of the rest; but fall into their places, like the Notes in Music, in which there should be nothing harsh or grating...." Then, after being gathered (in a "Withy-Dutch-Basket, divided into several Partitions"), cleaned, strained, they were treated with a dressing of olive-oil, vinegar, lemon or orange juice, horseradish, salt, pepper, mustard, the yolk of eggs, with sprinklings of aromatic herbs and of flowers and "thin slices of Horse-Radish, Red Beet, Berberries, &c." A silver knife must be used for chopping them up, and the salad-dishes must be of "Porcelane, or of the Holland-Delft-Ware" (rather than pewter or silver).

Pages 7-73 are given to a numbered list of 73 ingredients of salads. A few extracts will illustrate the plants used and the methods of preparing them.

"20. Cucumber, *Cucumis;* tho' very cold and moist, the most approved Sallet alone, or in Composition, of all the Vinaigrets, to sharpen the Appetite, and cool the Liver, &c. if rightly prepar'd; that is, by rectifying the vulgar Mistake of altogether extracting the Juice, in which it should rather be soak'd: Nor ought it to be over Oyl'd, too much abating of its grateful *Acidity,* and *palling* the Taste, from a contrariety of Particles: Let them therefore be pared, and cut in thin Slices, with a Clove or two of Onion to correct the Crudity, macerated in the Juice, often turn'd and moderately drain'd. Others prepare them, by shaking the Slices between two Dishes, and dress them with very little Oyl, well beaten, and mingled with the Juice of Limon, Orange, or Vinegar, Salt and Pepper. . . .

"24. Elder, *Sambucus;* The Flowers infus'd in Vinegar, grateful both to the Stomach and Taste; attenuate thick and viscid Humours. . . .

"26. Fennel, *Foeniculum:* The sweetest of *Bolognia:* Aromatick, hot, and dry; expels Wind, sharpens the Sight, and recreates the Brain; especially the tender *Umbella* and Seed-Pods. . . .

"27. Flowers, *Flores;* chiefly of the *Aromatick Esculents* and Plants are preferrable, as generally endow'd with the Vertues of their *Simples.* . . . Especially those of the Clove-Gillyflower, Elder, Orange, Cowslip, Rosemary, Arch-Angel, Saye, Nasturtium indicum, &c. . . .

"34. Lettuce, *Lactuca:* . . . ever was, and still continues the principal Foundation of the universal *Tribe* of *Sallets;* which is to Cool and Refresh, besides its other Properties. . . ."

No. 39 treats of "Mushroom, *Fungi*" at considerable length; Evelyn was very wary of this "suspicious Dainty," and of truffles, "these rank and provocative Excrescences."

"71. Vine, *Vitis,* the *Capreols, Tendrels,* and *Claspers* (like those of the *Hop,* &c.) whilst very young, have an agreeable *Acid,* which may be eaten alone, or with other *Sallet.*

"To all which might we add sundry more, formerly had in *deliciis,* since grown *obsolete* or quite neglected with us: As among the noblest *Bulbs,* that of the *Tulip;* a Root of which has been valued not to eat, but for the *Flower* (and yet eaten by mistake) at more than an hundred Pounds. The young fresh *Bulbs* are sweet and high of taste."

Many pages are devoted to a vigorous defense of the wholesomeness of salads, then apparently a controversial subject. The reader will find here a characteristic example of Evelyn's style, ornamented with allusions to history and quotations from the classics; nothing better illustrates his wide reading and learning nor the diversity of his interests.

The book closes with an Appendix of 35 unnumbered pages of recipes: recipes for cooking and pickling, for making cowslip wine and vinegar, for melting butter, and other things.

Between preface and text there is a section of eight pages entitled "The Plan of a Royal Garden: Describing and Shewing the Amplitude, and Extent of that Part of Georgicks, which belongs to Horticulture; In Three Books." This is the plan of a vast work which was to embrace all aspects of gardening. It is known that Evelyn actually wrote much of it; but the manuscript has never been found (Rhode, p. 91). The *Kalendarium* and the *Acetaria* formed two of the chapters. The *Acetaria* was reprinted; we have in the library a copy of the second edition, bound in with the tenth edition of the *Kalendarium* and dated 1706; both of these are included, with the *Pomona* and the *Terra,* in the fourth edition of the *Sylva,* which appeared in the same year. In this year also the author died, at Wotton, aged 86 years.

(To be continued)

Clematis For The Garden

By **E. J. Kraus**

THE various species and varieties of clematis are among the most graceful and striking of garden flowers. For the most part only the dark purple, free-blooming Jackmanii, trained to a trellis or wire-mesh screen against a porch column, is seen. Interest is rapidly increasing in clematis, however. Jackmanii is but one among many that are now available. Many others are even more effective. True, not all the varieties are equally vigorous, but most of them will survive year after year in spite of winter cold and often a minimum of care. There are many places where they can be used other than trained on wires or trellises of verandas.

Few people realize how effective the vine types of clematis are when planted above a retaining wall of stone or concrete and the vines are allowed to droop down its face. In like manner, they make excellent screens when trained on fences. Another effective way to use them is to allow them to climb over shrubbery or to reach up into trees. Generally their foliage is not so dense as to shade or smother out the bush or tree on which they are permitted to climb. One of the most hardy species, *paniculata,* is a rapid, hardy, sturdy grower. Another good one is *recta mandschurica.* The former flowers in late summer, the latter in June. Both produce masses of small white flowers. In the case of *paniculata,* the flowers are followed later in the season by fluffy seed heads that may persist long after the foliage has fallen; often they last into the winter and are very attractive when small masses of snow have collected on each seed head.

Perhaps not many gardens may contain tall stubs of trees which have been cut down, or shrubs which have died from one cause or another. But if one does have such objects in his garden, they can be transformed into things of beauty by allowing clematis vines to cover them. By planting the vines nearby, they spread over the stubs or such dead or living branches as may remain.

If no fence, shrub, or tree is available, one can still have clematis in his garden. This may be accomplished by tying small poles or tree branches together at one end and spreading the other ends apart in order to form a sort of tall tripod. Over such a tripod the vines may be allowed to climb. Old tree branches, or rough surfaced poles are better for this purpose than smooth poles, because clematis vines climb and stick fast to supports by means of their leaf stalks. These stalks of the leaflets or of the leaves can more readily grasp rough, scaly pieces of old bark than they can anchor themselves on smooth poles. If smooth poles are used in making these tripods, then twine or wire extending from the top to the bottom must also be provided. The stalks of the leaves or leaflets of the vines will grasp such means of support and, in the course of a growing season, will reach the tops of the tripods, resulting in great cones, covered over with vines and flowers. If space is available, two slatted platform-like pieces, each about two feet wide, may be set up so that they touch at the top and spread out at the bottom. The vines will readily clamber over such an arrangement and very quickly change it from a somewhat unsightly object to one of summer-long beauty. An ingenious person can readily devise other types of support for the vines. Thus, as already stated, they need not be confined to porches or similar places about a house.

There are, also, types of clematis which do not climb but grow as bushes or shrubs. If one has a shady spot under trees, some of these shrubby types

The good-sized flowers of Clematis "Madame Baron-Veillard" are rose-lilac

***Clematis paniculata* climbs over stone wall and up shrubs at left**

Left. Clematis "Comtesse de Bouchard"

Right. Clematis "Mrs. Edouard Andre"

Below. Clematis Lawsoniana

are very useful. One of the most attractive of these non-climbing types is the species *Davidiana*. It is thoroughly hardy, usually grows four to five feet tall, and bears great clusters of dark blue flowers throughout the summer. Another non-climber is a hybrid type. It is the variety "Mrs. Robert Brydon" and has light blue flowers. It is a more rampant grower than is *Davidiana*. Because its stems are rather flexible, especially when grown in partially shaded spots, it should be tied to some sort of support such as a stake or a fence. In an open, partially shaded spot under trees it makes a good showing because of its masses of light, porcelain-blue flowers. A third non-climber, *integrifolia*, does well when used as a low border plant. When well established, it sends up individual stems in clusters eighteen inches to two feet high. Each stem is topped by a shining dark blue and white flower of medium size and of heavy texture. It is one of the best and most suitable of the non-climbing types for use as borders or as individual clumps in the garden.

The soil requirements for growing clematis well are few. They prefer a medium, open, clay-loam soil, which is not acid. If the soil in which they are to be grown is acid, it can readily be made suitable for their culture by the addition of small quantities of lime, either at the time of planting or in later applications to the surface, which is then lightly cultivated in. Care should be taken to avoid injury to the roots of the plants.

The plants grow well either in full sun or in partial shade. It is especially desirable that the soil about the roots be kept cool by the use of light mulches of leafmold, light coverings of lawn clippings, or other available material. Moderate amounts of water should be applied during the drier, hotter days of summer.

Most of the larger-flowered, vine types make their entire growth during a single growing season. The flowers are produced on this new growth. The old vines may be removed in the autumn after they have matured fully or they may be cut back to within three or four inches of the soil level in the spring. New shoots spring up at the bases of the old vines, early in the springtime. These new vines grow with great vigor and by midsummer are in full flower. Flowering often extends well into the autumn months. In the Pacific Northwest flowering extends from mid-June to early November. One species, *paniculata*, as already mentioned, flowers in late summer and early autumn. If one desires he may plant *recta mandschurica* and *paniculata* near each other and thus have a nearly continuous blooming season from early summer until late autumn.

There is a wide range of colors available — some of the more vigorous and hardy clematis, listed according to color, are:

Purple — Jackmanii, "Gypsy Queen," Jackmanii superba.

Blue-purple — Ascotiensis, "Lord Neville," "King Edward," "Ramona," "The President." "Prins Hendrick" is especially attractive, because of the ruffled edges of the floral segments.

Light blue and lavender-blue — Lawsoniana, "Mrs. Cholomondeley."

Red — "Mme. Edouard Andre," "Ville de Lyon," "Crimson Star," "Ernest Markham."

Pink or lilac-rose — "Duchess of Albany," "Mme. Baron Veillard," "Comptesse de Bouchaud." "Duchess of Albany" grows especially vigorously; its flowers are large and bell shaped rather than flat.

White — Henryi, "Fairy Queen," *paniculata* (late), *recta mandschurica* (early).

Yellow — *tangutica*. The flowers of this variety are rather small; they are produced in great profusion and later are followed by silky seed clusters.

This list is far from complete; other varieties are available in the range of colors listed. Among the blues and purples there is often great similarity, so much so that unless one is establishing a collection, it is not necessary to grow all of them. Also omitted from the list are all those varieties which bloom on two-year-old wood. Such varieties occur among the various strains of *montana*. They require rather special care in pruning and training and, unless well attended, may become rather unsightly tangles after several years of growth. Some of the *montana* types, also, are neither hardy nor vigorous in far northern areas except, perhaps, in the western sections of the states of Oregon and Washington.

The Crinum Lily In Southern Gardens

By Margaret P. Slaughter

Crinum amabile

Clumps of fragrant "milk and wine" lilies along with oleanders, crepe-myrtles, and magnolias are in the background of memories of every child raised in the lower South, especially in the Gulf Coast Region. Crinums have been called the lazy man's lily, their will to bloom is so great, their culture so simple. Actually, they are not lilies at all, but bulbs of the amaryllid family, with umbels of large fragrant flowers on a sturdy scape rising from the base of the bulb.

All are natives of the tropics, some coming from as far afield as Sumatra and Africa. Only one species, *Crinum americanum,* is native to this continent; it grows in swamp areas in Florida and along the coast. Its near relative, *C. Caribeum,* hailing from the West Indies, is a favorite in southern gardens for massing in high shade under trees, where it is in almost continuous performance during the hot months. The white buds, on the day of opening, stand out in lovely formal shape like arms on a candelabrum. Then toward sunset, with the unfolding of the starry petals, the flowers of *C. Caribeum* look like opening water-lilies. Another species, *C. scabrum,* a low-growing type, has strap foliage and funnel-shaped flowers with broad carmine-red stripes. But the queen of the old ones is the familiar "milk and wine" lily, *C. erubescens,* whose white salver-formed blooms are striped with wine. This is a favorite subject in antique flower prints. It is a late summer into fall bloomer, a sparse time for flowers, so doubly welcome, as its pink-striped clusters are enchanting in arrangements.

Two giant crinums, *C. augustum* and *C. amabile,* of the "milk and wine" group, make handsome accents where one has the space to accommodate their massive foliage and four- to five-foot scapes of intensely fragrant white with wine-shaded, pink-striped clusters. *C. amabile* is especially a favorite with men, but because of its size does not fit into small gardens.

Crinum giganteum, a shade lover and a fall bloomer, has unique, decorative, light green foliage shaped rather like aspidistra leaves. Its waxy white flowers have fascinating grey anthers. With us, *giganteum* starts flowering in late July and continues periodically until frost catches it in December. Its hybrid, known as the "St. Christopher lily," is a spring bloomer, flaunting clusters of white porcelain-like cups of great beauty. Its upright foliage is only slightly narrower than that of its parent, *giganteum.*

The hybridists have given us such variety and improved texture in their modern named crinums that even in a small garden one may be assured, by careful selection, of a succession of flowers for arrangements and for effect in the garden from April through November.

Their culture is simple, as long as they have peaty rich soil, plenty of moisture, and a sunny perch in the garden — for most of the family. The exceptions, favoring high shade, are the pastel pink *C. Moorei, giganteum,* and the "St. Christopher lily."

Crinum Moorei is chiefly valued as a parent, among the most notable of its seedlings being the indispensable "Powelli Alba," the pink "Powelli" and the handsome clear pink "Cecil Houdyshel," named for its distinguished originator. Again, *C. Moorei* demonstrated its value as a parent when the late Fred Howard successfully crossed it with *Brunsvigа rosea,* the prolific *Amaryllis belladonna,* thereby producing that queen of sum-

Amarcrinum Howardii

mer bulbs of our region, the pastel pink *Amarcrinum Howardii*. This lily, with its smaller bulb and restrained fan of foliage, not to speak of its pervasive hyacinth-like odor, blooms for us every three or four weeks from May till frost. As the cooler nights of fall approach, these blossoms take on a glistening saffron-pink hue which must be seen to be credited.

The early spring bloomers, "Cecil Houdyshel," Burbank's "White Queen" and "Powelli Alba" vie with each other for a first appearance in late April, showing their first umbels as the big pageant of azaleas nears its end. The original "Powelli" is a pink of mediocre distinction, to my mind. The same is true of "J. C. Harvey" and "Louis Bosanquet." A lovely exception in the pinks is Peachblow. However, the hybrid "Powelli Alba" has everything to offer the discriminating — form, texture, grace, and a long blooming season. It has become a great favorite of flower arrangers, even of professional florists.

There are two newer Dutch crinums in delicate pink — "Harlemnense," a trumpet-shaped flower of palest pink, and "Krelagei" white blushed with pink in the opened flower and pink buds. These are treasured additions, but as yet they have not proved themselves prolific bloomers.

Another vaunted large white from Holland growers is "Yemense," which is so tender it goes down regularly in our "blue northers" — frozen almost down to the basal plate, with the result that we have never had it bloom in Houston, Texas, to my knowledge. I have had the same experience with the exotic night bloomer, "Empress of India," a fragrant white with wine shadings. It is a collector's favorite in southern Florida, I believe; but to be safe here, this crinum should be grown under glass.

The unique, deep wine-colored "Ellen Bosanquet," flowering in June and July, is the handsomest of them all and is especially effective when combined either in arrangements or in the garden with velvety coleus and shell-pink amarcrinum. Another rare crinum, an English hybrid called "H. J. C. Elwes," has lovely rose star-shaped flowers on a rich bronze-colored stem. It has charm and is very graceful but, alas, is a scant bloomer.

Raven's Biography of John Ray, Naturalist

By **H. W. Rickett**

It is not often that a great scientist finds a biographer and critic worthy of him. John Ray was one of the real founders of botany and zoology, an outstanding scientist in a time of outstanding scientific achievement. Charles Earle Raven, Master of Christ's College in Cambridge University and Regius Professor of Divinity, has not only had a brilliant career as scholar and churchman, he is also an enthusiastic naturalist and has written on natural history, particularly on birds. His biography of Ray is a scholarly work, with all the usual panoply of footnotes and references to sources; it is also a critical evaluation of Ray's place in the history of science. Such a work would be impossible, of course, without painstaking study of Ray's times and of his contemporaries. Raven supplies us with a broad picture of science in seventeenth-century England; and he has since, in another book, broadened his field to present English science from medieval times onward.

In the recent teaching of the history of botany, Ray has been overshadowed by Linnaeus. This probably reflects the over-emphasis upon nomenclature that was the curse of much taxonomy in recent years; for Linnaeus deserves our gratitude chiefly for the method of naming plants which he (almost unintentionally) foisted upon the botanical world. John Hill, who was one of the first to introduce the Linnaean methods and doctrines to England, and who recognized the value of Linnaeus' treatment of genera and species, was acute enough to reject the Linnaean classification and to prefer the soundness of Ray's ideas; but, in spite of Hill, the Linnaean system prevailed in England and elsewhere, and retarded botanical progress for half a century. Only when botany could free itself from its purely artificial classes and orders, could it turn once more to the natural system for which Ray had laid the foundations.

Ray's first interest was in language; he became a notable Latinist, which was of value as a preparation for natural history. Hating controversy as he did, he readily turned away from the troubled political life of the time to the contemplation of the natural world. Some time after he was made a Fellow of Trinity in Cambridge (1649), he began to study the botany of the region, a study which yielded the *Cambridge Catalogue* in 1660. He traveled extensively in England, observing and collecting plants, birds, fishes, and rocks; later on the continent also. Recognition of his quality as a scholar led to his being offered the secretaryship of the Royal Society, which he, however, refused. He continued to travel and began to think of a Flora of England. The *English Catalogue* appeared in 1670. Ray was now ready for his real work — the classification of plants.

He was perhaps the first to discuss the nature of species in terms of interest to moderns; he defined a species as "a plant that comes true from seed" — not so far from a fairly general modern concept. He even adduced evidence from transplantation in distinguishing the characters of value in specific diagnosis. In forming the natural groups of plants and animals, he insisted on the use of all possible characters rather than fastening on one, as Tournefort was doing and as Linnaeus did after him in making his classes and orders. Ray was always a botanist rather than a taxonomist — not the same thing even in those days. His study of the structure and growth of seeds led to his famous distinction between monocotyledons and dicotyledons. In 1669 he published a paper on the motion of sap in plants and thus founded experimental plant physiology. He worked on drugs, rejecting the doctrine of signatures and astrological implications and suggesting instead an approach through observation and clinical study; he may be called a pioneer in medicine as in biology.

The culmination of his studies was the *Historia plantarum* (1687-88), the first great botanical treatise. Among the topics treated we may note chapters on the parts of plants, on yearly growth, on leaves and the influence of light on their color, on the parts of

(Continued on page 186)

A Reply to Mrs. Cooke

There are "middle class" suburban gardens in this country, too

By **Elise Ludlam Bowles**

Candytuft, daffodils, phlox, and early tulip "Advance" grace this garden border in late April

It is always interesting, though often disconcerting, to discover what someone else thinks of one. Alice H. Cooke's article, "A British Gardener Looks at Our Gardens," in the July-August 1953 issue of The Garden Journal, certainly proves this point. As a suburban gardener, I found her next-to-the-last paragraph especially noteworthy.

It has never been my pleasure to visit Great Britain or to see its gardens, but I do know their reputation. In touring our own country, I also have often felt disappointment that I have seen so little evidence of "middle class" garden enthusiasm, such as I know must exist.

At such times I have considered my own garden and those of my gardening friends, and have remembered our garden club tours. Our gardens, be they borders, beds, or walk-in gardens, are not where the touring public sees them. A forty-foot hemlock hedge about six feet high hides my own side yard from the street.

This is not because I want to keep my plantings selfishly to myself. The neighbors on three sides quite evidently get a great deal of pleasure from my flowers. So do those friends who take the trouble to come and look. And so do garden club members and church members who have seen my program of kodachromes. (This series of slides, by the way, was made to show how I maintain continuous bloom in my garden throughout the growing season.)

A desire for privacy and a desire to squeeze all the pleasure possible from the time and effort necessary to maintain such a garden in this part of the world are responsible for our rather secluded backyard and sideyard gardens. We spend very little time in front of our houses. We women at least spend a great deal of time in our kitchens. These usually look out on our back or sideyards. My own greatest spectator pleasure as a gardener is gained at my kitchen windows, while I wash dishes, prepare vegetables, and hand-wash the family socks and nylons.

Again, we do not have the time, space, or funds to shift whole beds of plants around from season to season. Therefore, most of us try to have at least semi-permanent plantings. One of my friends tries to have a colorful all-season herbaceous garden using perennials and spring bulbs, but no annuals. I have read and heard of others with the same ambition, but have felt no temptation to copy them. All-season color, achieved in this way, is apt, I believe, to be but a beautiful dream. There will be periods of gay bloom, in the spring, in the early summer, and again when the chrysanthemums come. At other times there will be just enough to keep the gardener trying for more, but that can be fun, too, for some.

I use annuals as well as perennials and bulbs and feel that I get more bloom per square foot by so doing. But it does take a great deal of planning and more time than the average person cares to give to it.

I make no attempt to have whole beds or borders of annuals. To do so would deprive me of the space needed for favorite perennials or roses which I want both for their own sakes and to keep up the succession of bloom. Under conditions here in our eastern suburbs, we could hardly maintain continuous bloom with annuals alone or even with annuals following spring bulbs, unless we had a greenhouse at our disposal or more money to spend than a middle-income gardener can spare for the purpose. There would probably be a burst of bloom from the bulbs in the spring and then a lapse until spring-sown annuals really got going about mid-July. Most annuals are killed by frost. If this were to come early in October, as sometimes happens even here near New York City, we would again have precious little bloom.

I prefer to follow spring bulbs with iris, poppies, and roses, lilies, monarda, and gypsophila. Early annuals are supplemented with daylilies, platyco-

Phlox, zinnias — "the cut and come again variety" — and marigold Sunny, fill the same border with color in August

gon, and phlox. Later ones blend with fall asters and early chrysanthemums. Late chrysanthemums keep me happy, even after frost has taken every other flower.

The above is no complete catalogue of the flowers that grow in my suburban garden, but it may serve to show why it is never "a mass of flowers all summer." Most perennials average two weeks of bloom but occupy their space in a small garden all year round. We must take this into account in our garden planning and viewing. Flowers there are, even masses of them, but the whole garden can never be in bloom at one time.

I like the constant change in my garden's appearance as the season progresses. There is always something to look forward to even as the present is being enjoyed. There is always work to be done, too, sometimes when it is very hot and humid and when the mosquitoes become unbearable as soon as dusk descends.

Perhaps Mrs. Cooke would have a somewhat different view of our American suburban gardens (and gardeners) if she could see a series of pictures such as I have, all taken in and of a single suburban garden. Mine is larger than the average, I admit, but it is still not too large to be maintained in fair condition by a housewife gardener.

Unless my garden club and ordinary experience and observation are entirely misleading, there are many "middle-class" suburban gardeners in this country, too, and they spend many "long summer evenings" working in their gardens.

RAMBLES OF A BOTANIST (from page 175)

Big Pine Key yields winter plants — the late Dr. Carl M. Wiegand said I sent enough plants to Cornell to keep seventeen people busy. This must be so, as they are not all mounted yet!

Florida, historically the oldest settled portion of the United States, is geologically among the youngest. The fabled "Fountain of Youth" gave it early fame among explorers; in reality the "Fountain of Youth" is based on tales of the large limestone springs (Silver, Rock, Wekiva, Weekiwatchee yield an incredible number of gallons per minute). Florida is not all low-lying, sandy, and monotonously level plain. It has gently rolling low hills in the north and west and a ridge, in the center, a little over three hundred twenty-five feet high at Iron Mountain in the scenic highlands or lake regions. In the northwest and central part of the state the surface is dotted with clear water — picturesque and beautiful lakes, and Florida has a number of rivers the most important of which are Escambia, Blackwater, Chocktawhatchee, Apalachicola, St. John's, Hillsboro, Caloosahatchee, Suwanee, Ocklawaha and Anclote. There are limestone, clay, marl, and phosphate formations which fall into the Cenozoic, from Eocene to Recent. A well drilled in Marion County, sixty-one hundred feet, met mica schist, slate, and quartzite over four thousand feet down. Since these deposits the state has been dry land for ages, then covered by the sea for other periods, especially below the Tampa-Daytona area. Ocala limestone, not coral, is the foundation rock of Florida — a pure calcium carbonate from which deep wells of palatable water are obtained.

JOHN RAY (from page 184)

flowers with a recognition of Grew's claim that the stamens are the male organs, on transmutation of species (of which he was properly skeptical), on diseases of plants. Such works then as now were difficult to get printed; in fact, it was more difficult without large classes of university freshmen to whom their purchase might be prescribed. The book did not run to a second edition; in which it may be contrasted with works on gardening and other phases of applied botany, such as Evelyn's *Silva*, which was printed in 1664 by command of the Royal Society and ran through four editions in the author's lifetime and several after his death.

Ray was interested in animals as well as plants. His well-known friendship with Francis Willughby (whose untimely death in 1672 was a severe shock to him) led him towards zoology, and his writings on birds, fishes, mammals, reptiles, and insects were undertaken partly to discharge what he conceived as his debt to his dead friend — carrying out what they had planned together. In each of these subjects, as well as in paleobotany, he is said to have built the footings on which further scientific study was founded. He undoubtedly had a genius for reviewing and digesting all previous work and selecting what was really of moment in the light of his own observations and experiments. Naturally he was recognized all over Europe as the leading naturalist of his time, and was in correspondence with such men as Sloane, Petiver, Hotton, Sherard, Lister, Rivinus.

His last great work was *The wisdom of God as manifested in the works of the creation,* which appeared in 1692; it has been extensively quoted and imitated, and in a sense can be said to be an ancestor of *The origin of species by natural selection.* In this he deals with what we should now call adaptation, the relation of form to function, an integrated picture of the living world which was not, in his view, haphazard. Although inevitably framed in the Book of Genesis, the work betrays a recognition of certain difficulties and a willingness to face them; we cannot doubt that if a doctrine of evolution had been possible at that time Ray would have embraced it.

One would imagine, from such a record, a man who enjoyed robust health and freedom from the ordinary cares of living. The opposite was true. Ray, educated in Cambridge and ordained in the Church of England, could not with a clear conscience accept the Act of Uniformity of Charles II. He resigned his Fellowship in 1662, giving up pupils and the chances of advancement in the Church, and condemning himself to a life of poverty; he managed somehow to provide for a wife and children. He also suffered from ill health, being terribly afflicted in his later years with sores on his legs. In spite of everything he lived to old age and enriched the world with a prodigious amount of scientific and other writings.

The story is told lucidly as well as with scholarly regard to original sources. Naturally, no small book could suffice for such a career and for such a man; it runs to 506 pages. This is the second edition, differing from the first only in the inclusion of supplementary material.

JOHN RAY, NATURALIST. Charles E. Raven. 506 pages, indexed. Cambridge University Press, New York. Second edition, 1951. $7.

For the Younger Generation of Gardeners

TAMING WILD GRASS

By **Sarah R. Riedman**

Continued from the Sept.-Oct. issue

Europe and Asia had wheat, barley, rice, and other grains. America had corn. The Indians believe that maize or corn was a gift from the gods. In time it certainly became the Indians' gift to the world. The early peasant of Asia and Europe had tamed or domesticated animals. The American Indian had no cattle, but he developed corn. He lived only partly on the bison he speared and the small animals he tracked down. Mainly he lived off his corn patch. Today, the plant scientist and breeder marvel at how the Indian had learned to breed this perfect food plant, the dream of prehistoric man. There is the story of Hiawatha who prayed that his people would not have to get their food only by fishing and hunting. His prayer was answered. From the grave of Mondamin, carefully tended according to this god's instructions, grew this wonderful plant which never failed to give food to the people.

Until Columbus discovered America, corn was not known to the white people. The first colonists soon learned from the Indians how to plant maize, which they called corn. It is said that the Pilgrims who had come to America on the Mayflower learned the value of this New World plant during their first hungry winter here. They came upon a buried store of Indian corn. What a lucky find that was! After that, maize spread to Europe and to China, just as wheat from Europe was brought to grow in America.

Why has corn remained America's prize crop since the Indians first began to cultivate it? How long did it take men to nurse the corn through change after change until it grew into a plant far different from its unknown wild ancestors? What qualities did they encourage in the growing corn, and which did they try to weaken or kill? We know that it has taken centuries to breed today's fastest race horses, the best milking cows, or the best laying hens. The prize race horse is most unlike its ancestors. It is the same with corn. While cultivated or domesticated wheat still resembles wild wheat, its ancestor, corn, certainly does not. It has become as much of a specialist as the race horse, the cow, or the hen. Its main man-made job is to yield a rich, fully used plant food for man, its tamer.

Taming of grass usually means growing more than you can eat. The Bible tells the story of Isaac, who sowed his field, and "received in the same year an hundred fold." When people talk of storing food away for "lean" years, they mean saving grain from a "fat" harvest to feed on when the harvest is poor. Cultivation of grasses meant saving up food against famine. Having food when none was growing meant not having to move around in search for greener fields. It meant settling down in one place. People who were always on the move in search for food had no time for leisure or for learning newer and better ways of life. The cultivation of grain made it, in fact, necessary as well as easy to stay in one place.

The plow was the first important tool the ancient farmer had. The first plow was made of wood, very different from the kind the farmer uses today. Still, when drawn by an ox, the plow pulled up a deep furrow in the soil. The grain could now be planted deep enough, and out of reach of the birds, the burning sun, and the hard rain. The plow also dug deep enough to pull up the tough roots of unwanted grass. Now the young wheat, barley, and oats had some chance to grow a full seed head, with a rich store of food. The wooden plow was the first of many and better machines which helped the farmer to grow more and better grain. Yet machines couldn't by themselves bring forth a grain heavy in yield, good-tasting, able to stand the cold and the deadly attacks of plant diseases. This took many more ages to learn, and we are still learning to improve our crops.

You remember the seed heads that form on all grass plants. Seeds are the infant plants. In wild grasses, the seed heads fall apart, and the wind scatters the seeds. We then say that the plant seeds itself. When we cultivate plants, we don't want the seeds to scatter. We want to collect them as our harvest. Most of the grain we eat, but some we save to plant the next spring. Now, corn seeds most certainly do not scatter. They remain tightly packed on the ear of corn, ready to be eaten. No other cereal has this advantage. That is one reason why corn gets the plant-breeder's prize. Without much work it can be dried and stored against another year's famine. You see why Hiawatha prayed for a food that his people could depend on in lean years.

This cherished Indian food does even more. Its flowers make a great deal of pollen, much more than is needed to develop the ovules into seeds. Some of this pollen Indians gather and make into a pollen soup. Not only does corn differ from other cultivated grains in its many uses as food and fodder; it is also more highly domesticated. It is probably the most highly specialized, if not of all plants, at least of all grains. It seems to have lost all the qualities of a wild plant. It never seeds itself. It can't grow wild. It can't grow among other cereal grains. It is most easily destroyed by weeds. A farmer never weeds a field of oats or wheat, and surely not of hay; but he must weed his corn, if he wants to harvest it.

Maize must have been very important to the Indians. Certainly it was the staff of life of the native people of North and South America. Over many, many centuries they nursed it and tended it with great care to grow it better and better with each generation. Improving the quality of a plant or an animal better to suit the needs of man is called selection. It is just like mating the fastest running horses to breed a young race horse. The Indians may have used other ways, such as cross-breeding two kinds to get a new variety of corn.

Philodendron dubia

Philodendrons

By **Frank Rich. Jr.**

MUCH has been written recently on the use of plants in the modern home, office, and commercial establishment, but most of this has been from the interior decorator's point of view. Information on care, likes and dislikes, and individual characteristics of philodendrons has been noticeable by its scarcity, mention merely being made that those plants best suited to the conditions of light, heat, and humidity indoors are aroids or sometimes naming them as philodendrons.

Florists have been prone to list many allied genera under the philodendron name; but with the ever-increasing number of philodendron species becoming available and proving adaptable to indoor culture, they are becoming more conscientious about labeling their plants correctly.

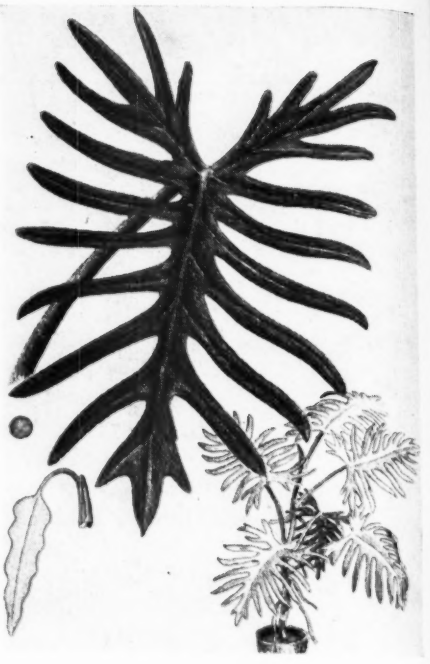
Today, with such places as dime stores, drug stores, and super markets now handling these plants, uninformed clerks are unfortunately giving out misinformation about the care of the plants they sell.

Philodendrons are mostly from the tropical jungles of Central and South America where they have lots of rain to keep them moist, plenty of light, though little or no sun, and plenty of rich humus. Most species are terrestrial, though some are epiphytic, growing in the decaying leaves and bark found in the crotch of branching trees.

The potting mix for growing philodendrons indoors should be highly organic in content. I do not care to give any specific mix formula as a rule, because people often get the idea that unless it is followed exactly, the plants will not do well. And again, others who have been successful with one type of mix will switch to the new one and the plant, which has become adapted to the first mix, will not do as well in the second. However, the mix in which my plants thrive is:

Three parts partially composted wood shavings (to give the mix porosity and good drainage); one part compost (to furnish bacteria and food); and one part well aged manure — to this I might add leafmold or peat moss, bonemeal, charcoal, Sponge Rok (soil sulphur if water is highly alkaline). I never seem to be able to mix enough to last for any great length of time, and each batch will vary according to the ingredients on hand. I have not noticed any appreciable difference

Philodendron erubescens



Philodendron elegans

in the plants grown in the different mixes, except when I have added soil; then there seemed to be reduction of leaf size in direct proportion to the density of the mix. Although the mix is rich in plant food, regular feedings of nitrogen-rich, liquid fertilizer will increase the lush growth so desirable in these plants.

Water should drain rapidly through the potting mix and the mix should never be allowed to dry out; occasional spraying or moistening of the leaves is beneficial in the less humid areas. Sufficient water is probably the most essential factor in keeping philodendrons growing evenly with large uniform leaves. Some species, which come from the more arid regions, will merely tolerate dry conditions but will not thrive.

Excessive yellowing and leaf drop indicate water around the roots — check to see if the pot has good drainage. If in a planter, withhold all water until mix is dry for at least one-half inch below the surface.

When the tips or edges of leaves turn brown, it is an indication of a concentration of salts in the rooting medium; this may be alkali from the water or residues from excessive fertilization. Salts may be flushed out of pots and tubs by letting water run slowly through the pot, for at least an hour. A dressing of manure should be

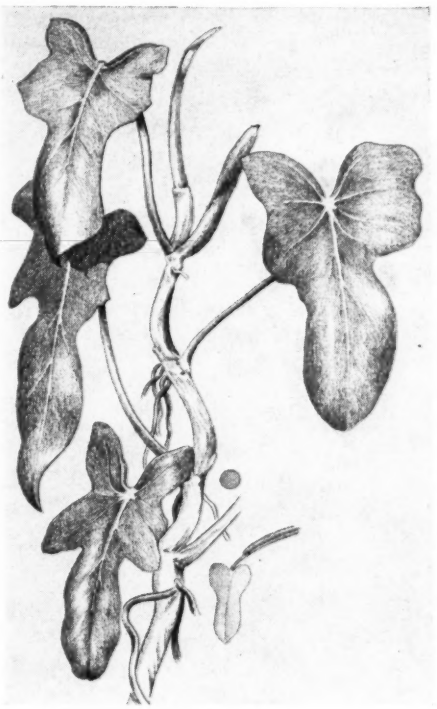
added to the container after this flushing to replace nutrients washed out by this process. In planters with no drainage, the plants should be removed and all soil rinsed from the roots, then replanted in a fresh moist mixture. In areas with highly alkaline water, rain water, distilled water, or water obtained from defrosting refrigerators is ideal for watering the plants and any burning of the leaf tips will cease.

Leaves which become smaller and smaller or tend to return to juvenile form may be caused by a separation of the organic matter from the soil, leaving the rooting medium in a hard cement-like condition which the roots cannot penetrate easily; also, this soil is very hard to keep moist, as the water merely runs down the inside of the pot, leaving the core dry. Or it may be that the plant is not watered often enough. Another cause of reduction in leaf size may be simple starvation. Philodendrons are heavy feeders and should be fed monthly.

A gradual slowing of growth along with smaller leaves often indicates a potbound condition and repotting is in order. It is a good practice, in this event, to wash all old mix from the roots and repot in fresh moist mix. Your plant will not suffer if the roots are not allowed to dry out during the transfer and the plant is kept out of drafts for a couple of days.

Philodendron hastatum

A weak or yellowish color in the leaves on an otherwise healthy appearing plant indicates the probability of too intense a light, or sunlight. However, if the same condition exists but the whole plant seems wilted and soft bodied, that would indicate too much heat and not enough humidity. On the other hand, small leaves and/or long leggy vines can be caused by too little light. (*Monstera*, sold under the name *Philodendron pertusum*, needs more light than true philodendrons or the leaves will not split as profusely as they should.)



Philodendron laciniosum

Philodendrons enjoy a life comparatively free from insect pests except for an occasional infestation of aphids or mealy bug which may be removed with any standard spray recommended for these pests. (Parathion should not be used on *P. speciosum* or its hybrids such as Evansii. Scale is the worst nuisance and may be removed with Volck oil spray which, incidentally, makes an excellent leaf polish if used according to directions.

With more and more species being brought in from the tropics, there is such a wide variety of size, shape, colors, and growth habits that many plant enthusiasts are developing interesting collections. One eastern grower is now offering fifty-seven species to the

Philodendron panduraeforme

commercial trade, and there are many others, at present available only to collectors. Hybridizers in Florida and southern California are now marketing hybrids, such as P. Evansii, Fosterianum, and Mandaianum that combine the best points of several species. Propagators are also developing mutants for the trade. We now have several variegated types and just lately a beautiful golden *erubescens* that still maintains that red blush. For the average home owner who would like only a few plants for decoration, the following are the most common and probably as easily grown as any. I have purposely left out the commonest one, sold as *cordatum* in every dime store, as I believe that one is well known to everyone.

Philodendron dubia or *dubium*. (This *dubia* of the trade is not the true *dubium* which has a shield-shaped leaf. It is believed by some to be *P. radiatum.)* A slowly climbing species with deeply segmented leaves of glossy dark green with heavy, leathery texture. Midrib and veins heavy, stiff, light green in color, slightly raised on top of leaf, very prominent beneath. Blade deeply lobed between each vein nearly to midrib, width of spacing equal to width of lobe. Posterior lobe divided into three, sometimes four diminishing lobes. Posterior vein marginal at sinus. Four to six lateral lobes. Leaf stem smooth, dark green, round in cross section, slightly flattened on top of base, equal to or up to twice the length of blade. Stipular sheath white

with fine interrupted lines of pale green, deciduous. Cane dark green, internodes one to six inches, depending upon light conditions. Air roots many, succulent, up to twelve inches long.

This plant requires plenty of light to remain compact and large-leaved.

Philodendron elegans. Climbing type with fern-like leaves of medium glossy green, up to twenty inches long by sixteen inches wide. Midrib slightly raised on top, prominent underside, stiff, slightly lighter than blade. Blade arches up from midrib; veins sunken, flexible, blade narrow on each side of vein, cut back nearly to midrib. Spacing between lobes twice the width of lobe; posterior lobe divided into four segments; lateral lobes six to nine on each side. Leaf stem round, equal to length of blade, dark green, highly polished, slightly maroon to purple discoloration at junction of blade; midrib at right angle to stem. Stipular sheath nearly white with pale green lines, deciduous. Cane dark green changing to light brown with age. Air roots few, succulent, very long, often reaching to ground below benches.

Philodendron erubescens. Vining type with large, heart-shaped leaves up to fourteen inches long; glossy dark green with a slight reddish cast on top side, coppery green underside; midrib sunken on top, prominent below; veins prominent underside; posterior lobes well spread; veins not marginal at sinus; leaf margins slightly undulate in mature leaves, edges membranous coral-pink; stipular sheath pinkish red to purplish red, deciduous. Leaf stem round in cross section, green, tinged with dark red, equal to length of blade on mature leaves. Cane reddish, internodes three to four inches. Many long air roots that dry to stiff, tough fibers.

This is a very attractive plant if grown in a very warm, brilliant spot as the red and purple colors are enhanced. It is a rapid grower.

Philodendron hastatum. A low climbing species with long, narrow, light green, glossy leaves; midrib flush, blade arching upwards to give sunken appearance, prominent underneath; nerves not prominent. Leaf up to twenty-two inches long by nine inches wide, widest point just above base of lobes; margins undulate; lobes nearly touching. Leaf stem from three-fourths to equal length of blade, round with slightly flattened top, winged for one-third of length from cane, leaf at slight angle to stem. Stipular sheath cream to greenish tan, deciduous. Cane medium green to brown with age, internodes one-half up to two and one-half inches. Air roots few, up to six inches long.

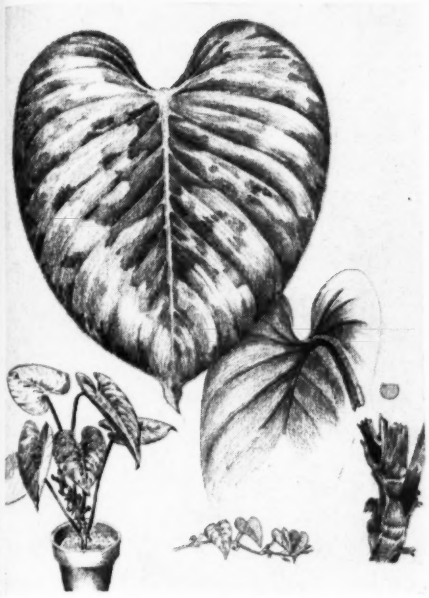
This is one of the best of the plants for the home with poor growing conditions, as the plant will take a lot of punishment. A similar species with a round, smooth leaf stem is being sold under the same name. The overall color is a darker, grassy green, and the plant is not as sturdy.

Philodendron laciniosum. A vining type with odd-shaped leaves, dark green, not glossy; leaf blade roughly triangular in outline, posterior lobes notched into five segments, three lateral lobes on each side, cleft nearly to midrib; apex of leaf is long-pointed, egg-shaped lobe. Midrib and posterior veins prominent two sides, heaviest below; veins slightly incised above, slightly prominent below, two veins to each lobe, close to and nearly parallel to each edge except in apexial lobe. Leaf stem dark green, oval, slightly flat on top, slightly winged for short distance at base; midrib is a straight continuation of stem. Cane dark green, internodes two to five inches. Air roots many, close to node, up to ten inches long.

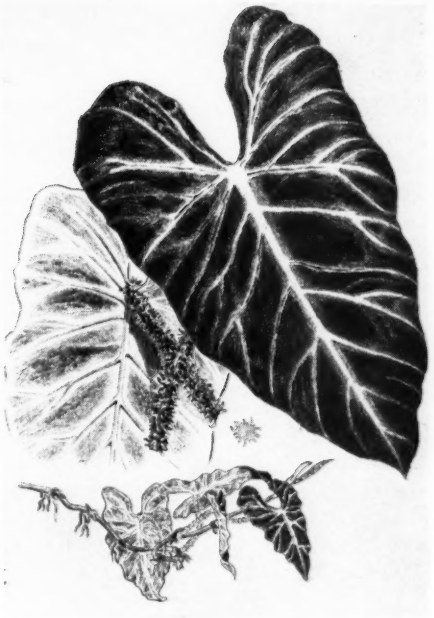
This plant does best when allowed to vine along a wall, or when grown in a hanging basket and allowed to drape itself around the basket several times. It is also good if grown among other philodendrons such as *P. cordatum* on a totem pole where the leaves can give contrast. *P. laciniosum* is semi-hardy.

Philodendron panduraeforme. It is a climbing (often vining) type with oddly-lobed leaves up to twenty inches long by eight inches wide. Midrib flush on surface, prominent underside; veins depressed on surface, semi-prominent

Philodendron Selloum



Phildendron Sodiroi



Philodendron verrucosum

Philodendron squamiferum

beneath. Posterior lobes wide, curved, flaring, joining lateral lobe at outer edge; sharp constriction at or short of midpoint of leaf to form terminal lobe which is long, narrow, tongue-shaped. Leaf stem dark green, round in cross section, slightly channeled on top for short distance at base. Stipular sheath greenish white with minute green lines, deciduous. Cane color a greyish tan, internodes one to two and a half inches. Air roots succulent, numerous, five to seven inches long, radiating like spokes of a wheel.

This plant is one of the finest in form, texture, and durability for a house plant. It maintains its leaves for an exceptionally long time. Its one disconcerting habit is to produce suddenly, for no apparent reason, long rangy canes with internodes up to ten inches long; then, just as suddenly, to drop back to normal growth habits.

Philodendron Selloum. Arborescent species with very large, twice-lobed, glossy, medium green leaves up to forty inches long. Midrib and primary veins very heavy, branching, marginal at sinus; blade arches up from midrib and veins; blade deeply cleft five-sixths of the distance to midrib between each vein. Seven or eight lobes to each side, each lobe itself has shallow lobes along entire length. Entire margins of blade heavily undulate. Thin, yellow, translucent membranous edge along margin. Leaf stem long, up to one and one-half length of blade, gracefully arching, flat top with wide flat channel entire length, enlarged at base, surrounded at base with fringe of stiff, persistent, flat, dark brown scales up to one-quarter inch long; midrib at only slight angle to stem. Stipular sheath white, two heavy ridges running entire length, sides angled at ridges, deciduous. Cane heavy, no internodes, large oval leaf scars surrounding cane. Air roots flexible, very long (will continue to grow until they can penetrate soil, where they strike fibrous roots and become auxiliary trunks furnishing both support and nourishment).

This species has four distinct leaf stages from seedlings to adult and may be held in any stage for long periods of time by keeping potbound. As a mature plant it will take full sun and is hardy to about 26%. An excellent plant for those who have the room, as it grows to tremendous size.

Philodendron Wendlandii

Philodendron Sodiroi. Semi-arborescent species with large heart-shaped leaves up to sixteen inches long by twelve inches wide. Tip of leaf long, pointed; background of leaf dark olive-green with large irregular mottling of light grey, giving a silvery appearance to leaf; midrib flush, light green with tiny line-like dots of dark green; blade arches sharply up from midrib; veins deeply sunk on top, giving a corrugated effect to leaf; edges thin, membranous, pale red changing to ivory on older leaves; midrib and veins very prominent, under-side dark red for one-third their length. Leaf stem up to one-third longer than blade, bright red for short distance from cane, dark red equal distance from blade attachment, rest dark green, whole stem covered with hard, raised white dots, more prominent at upper end; cross section of stem flattened on top with raised center, edges hard and sharp; stem takes a sharp bend short of blade attachment so that blade is nearly parallel to stem. Stipule bronze-red, soon drying out and becoming fibrous, persistent; internodes very short in adult form. Cane nearly covered by fibrous dried stipules. Air roots few and very short.

The juvenile form of this plant would seem to be another species, it is so different. Juvenile leaves long, narrow; winged leaf stem; long internodes; quite vining habit of growth.

In adult form, as the plant is large enough to produce leaves of maximum size, they lose the silvery appearance and become a dull green.

Philodendron squamiferum. A vining type with a very twisted habit of growth with light yellow-green, very glossy leaves up to fourteen inches in length; midrib and veins lighter in color, flush or very slightly depressed on top, prominent underneath; midrib red on under side of leaf; blade arches up slightly from midrib. Leaf stem ranges from one-half length of blade in small leaves up to one and one-half blade length in larger leaves; stem dark red with pink, succulent, twisted hair-like scales on new stem, darkening to green with whitish hairs as leaf ages. Leaf darkens slightly with age. Stipule brilliant coral with white inside edges, deciduous. Cane normally not straight, curving at internodes or angling at nodes; internode length very irregular from one to three inches. Cane covered by light brown or tan tissue-like bark. Air roots numerous, clustered, up to six inches long, soon withering to tough string-like fibers.

The leaves of this species have been likened in shape to the Malayan kris. *P. squamiferum* will flower readily in a humid condition. Spathe coral-pink to orange with a profusion of white and very pale green soft bristles on outside; inside coral blending to ivory with darker fine parallel lines running vertically; spadix white.

This species makes an excellent hanging basket specimen.

Philodendron verrucosum. Long, vining type with dark velvety, undulate leaves up to eighteen inches long by ten inches wide. Roughly egg-shaped with a long pointed tip; posterior lobes very long, slightly overlapping in mature leaves; midrib light green, firm, sunk on top, very prominent underside; veins appear to be incised on surface of leaf, light green, very prominent underside; secondary veins slightly depressed on surface, light green, prominent below; blade thin, undulate on entire surface, light green at midrib and veins, shortly shading to nearly black between veins, chatoyant; underside light green with reddish maroon areas between veins. Leaf stem round, equal to length of leaf, covered with soft, succulent bristles and hairs; stem intense red with greenish white hairs; stem turns green with age and hairs become slightly more green. Stipular sheath medium green, covered with white hairs on outside, persistent, shriveling tightly to cane. Cane a pale brown or greyish tan, tendency to angle slightly at nodes and to bend in internodes; internodes three to six inches long. Air roots numerous at internodes, two to five inches long, soon drying out to become fibrous, dark brown.

This is one of the most spectacular of the philodendrons. However, it has a tendency to drop all lower leaves as new ones open up, maintaining only three to five leaves at one time. This may be remedied, to a degree, by allowing air roots to penetrate some constantly moist material.

Philodendron Wendlandii. An arborescent species with long, narrow, glossy dark green leaves, growing in a rosette; midrib very wide at base, tapering to a point at extreme leaf tip, flattened on top, raised somewhat above blade, round and prominent below; veins at nearly right angle to midrib, curving slightly towards apex, not prominent; base of blade very bluntly rounded, fanning out gradually until widest point about three-fourths of the way to tip, then tapering off to a blunt point; blade up to thirty-six inches long by ten inches wide. Leaf stem swollen at base, pithy, flat top, acutely angled edges; rounded sides and bottom, one-quarter length of blade; midrib is a straight continuation of stem. Stipular sheath light ivory-green striped with darker green, ivory-rose margins, deciduous. Cane heavy, closely marked with round leaf scars. Air roots few, long, woody.

This plant makes an excellent centerpiece, as it is symmetrical from all sides. A very attractive plant as a single specimen.

EXPEDITIONS (from page 172)

The most interesting and important collecting area found in the vicinity of Maroa in the upper Guainía was at a savanna hitherto not studied botanically. From it we obtained numerous new species, many of them seeming to link the highland floras of the sandstone mountains of Guayana to the anciently related floras of Brazil, particularly those south of the Amazon. Collecting was essentially concluded at Maroa on April 17. Our route was retraced down the Guainía, up the Casiquiare, and again down the Orinoco, arriving at Puerto Ayacucho on April 23.

This phase of our expedition, yielding to us an additional six hundred thirty collection numbers, brought to a close an over-all river journey of some five thousand miles by "falca" and Johnson outboard motor. Our powerful Johnson Seahorse "25," donated by the Johnson Motor Co., had faithfully served without interruption of service (except for lubrication), pushing our three-ton load surely and steadily up endless river highway and through hundreds of miles of dangerous white waters.

We again went down the river from Puerto Ayacucho to Ciudad Bolívar on the motor ship "Apure," arriving at Ciudad Bolívar on April 29.

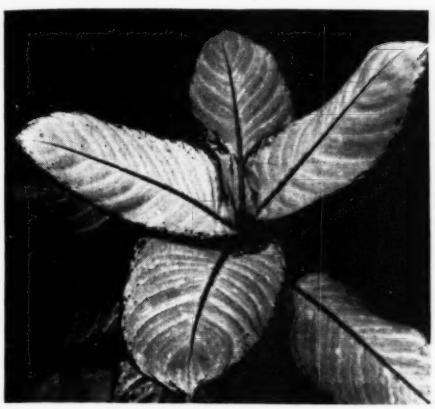
Cerro Bolívar and El Pao

From Ciudad Bolívar we made further short visits to the iron ore mountains of Cerro Bolívar and Cerro El Pao, the former being a concession of the Orinoco Mining Co. (U. S. Steel) and the latter of the Iron Mining Co. of Venezuela (Bethlehem Steel). Dr. Wurdack collected in the former, while I collected at El Pao.

Caracas

From El Chaure, the Sinclair Camp at Puerto la Cruz, we immediately went to Caracas for interviews with Dr. James H. Kemplon and other authorities of the U. S. Embassy and the Venezuelan government, and to visit Mr. and Mrs. William H. Phelps, Jr., who have assisted us in so many ways in our work. While at Caracas Dr. Tobias Lasser, Director of the Venezuelan Forest Service, presented us with a proposal for a joint Venezuelan-New York Botanical Garden survey of Venezuela. This survey would undertake an inventory of the all-important plant resource and vegetation cover of the country.

Return to New York was made aboard the Sinclair-chartered ship "M. T. Kaia Knudsen" of Norwegian registry.



DIEFFENBACHIAS

Popular House Plants

By Walter Singer

Along the banks of small rivers and in swampy regions of the American tropics is the home of dieffenbachias, named in honor of the botanist Dieffenbach.

Today, dieffenbachias are among the most popular house plants because of their beautiful foliage, their adaptability to modern living-room conditions, and last but by no means least, because they are easily propagated and grown by the commercial greenhouse man, thus making them readily available to the public.

Not always was the dieffenbachia as welcome as it is today. According to an old story, natives of tropical countries punished bad women and their mothers-in-law by compelling them to chew a piece of dieffenbachia. This would cause their tongues to swell immediately and become paralyzed so that they could not speak for days. No doubt this is the origin of the common name, dumb-cane.

Dieffenbachias grow to fairly large, erect shrubs in their native countries—Colombia, Guiana, Brazil—and build strong stems or canes which are the main source of propagating material. Most of them are satisfied with moderately warm room temperatures and a light that does not necessarily have to be direct sunlight. They should be watered well but the soil should always be given a chance to become dry before being watered again.

The two dieffenbachias most widely known as house plants are *Dieffenbachia picta* and *D.* "Rudolph Roehrs." However, there are several other species which are ornamental and should be better known in the modern home. These are illustrated here, together with *D. picta* and *D.* "Rudolph Roehrs."

First column, top to bottom—
D. picta has dark green leaves which are oval-shaped and blotched and sprinkled with white.

The leaves of D. "Rudolph Roehrs" are nearly all creamy yellow with green border and midrib.

D. amoena has leaves somewhat larger and thicker than those of *D. picta* and not as highly variegated. This dieffenbachia is becoming popular.

The leaves of *D. Jenmanii* are narrow-shaped, glossy green with white bands along the lateral nerves, like a zebra design.

Second column, top to bottom—
D. Bausei has narrow leaves that are yellowish green with a dark green edge and white and dark green spots. This one is a little tender.

The large-leaved species with the toughest foliage of all dieffenbachias is *D. Parlatorei* var. *marmorea*. The leathery, glossy, dark green leaves are spotted silvery white.

Th stem of *D. Seguine* has a striking variation; the leaves are marked with yellowish green spots.

D. longispatha likes a warm room. Its smooth, dark green leaves have creamy white midribs.

BOOK REVIEWS

WATER. Thomson King. 238 pages, indexed. Macmillan, New York. 1953. $3.50.

What a wonderful task Thomson King has performed in a little over two hundred pages of easy-to-read print and text on a topic—"Water"—which has absorbed most of his leisure time and active, acute mind since childhood days!

The first part of the book deals with the extreme importance of water in the world, showing—for instance—how it is a stabilizer of climate, a leveler of mountains, a dissolver of chemicals, and the source along with carbon dioxide in green plants of all the food and most of the oxygen in the world and the main means of converting the sun's energy into forms that man can use. The second part of the book deals with water and the life of man, showing—for instance—how civilizations have waxed and waned according to their water supply, how nations have risen or fallen according to their control of the sea, how water pumps and water in its gaseous form of steam have wrought miracles in saving human energy and in raising living standards, and—lastly and most importantly—how essential it is for man individually and collectively to conserve this precious substance.

The lack of illustrations is amply compensated for by the excellent word pictures and even word dioramas conjured up by the author. For the former the reader can easily visualize the minute atomic pattern of water, or the varied appearances of the microscopic organisms in it, or its molecule by molecule erosion of rock; and for the latter the reader automatically envisions eight-mile square icebergs lasting ten years, or the many tons of water transpired by a field of alfalfa, or the tremendous deposition of silt in the huge man-made dams negating in time their use in flood control, or the ever active form-changing cycle of water the world over.

The author imparts to the casual as well as the careful reader his personal feeling of awe developed from his careful observations and his scientific studies of water in all its locations, conditions and activities. The facile writing style and the simple, vivid presentation of facts in this book make it appealing to and important for schools, garden club folk, conservationists, and the general public.

ALMA L. MOLDENKE
Evander Childs High School
New York City

SUGAR COUNTRY. J. Carlyle Sitterson. 414 pages, illustrated, indexed. University of Kentucky Press, Lexington, Ky. 1953. $6.

The author has gone to original sources: manuscripts, government documents, newspapers, periodicals and contemporary travel and descriptive studies, to assemble the material for this book. In consequence, we have here a highly documented story of the history of sugar cane and cane sugar primarily in Louisiana but touching other states insofar as the industry spilled over into Texas, Georgia, South Carolina, Alabama, and Mississippi. Although the economic importance of cotton and tobacco in the life of the South is generally realized, the story of sugar had not previously been so thoroughly told. In fact, the only adverse criticism from the standpoint of the general reader is the plethora of detail, names, places, plantations, and dates. This obviously is less applicable to the view of the historical researcher, who will find the book a mine of information and references.

This book tells the story of the evolution of sugar production from a simple, open kettle affair, operated by slave labor, to its present status where mechanical engineers, chemical engineers, and control chemists supervise one of the most efficient and largest operations of its kind. The impact of the principal events in American history on the industry is clear and fascinating. This is recommended reading for anyone interested in the sugar industry or the people and institutions of the deep South.

H. B. HASS
Sugar Research Foundation, Inc.
New York, N. Y.

DECORATING WITH HOUSE PLANTS. Ruth Gannon. 136 pages, illustrated, indexed. Studio-Crowell, New York. 1952. $5.

This is an excellent book and a "must" for everyone interested in decorating the home with growing plant material. It is easy reading, for Miss Gannon writes in a very natural manner, giving a wealth of information based on her own vast experience in the growing of house plants. This book is beautifully illustrated, showing the many charming ways rooms can be decorated.

The author has not only suggested numerous plants which can be used in various rooms, but has given very interesting and comprehensive suggestions on their care, such as light, temperature, soil, potting, feeding, pruning and insect control.

Whether one is interested in foliage or flowering plants, bulbs, vines, cacti, or succulents, there is a chapter to be found. One often wonders how to care for a gift plant —chapter 10 tells all about this.

There are also lists of all types of plants, orchids included, giving the different classifications, the color, size, propagation (whether by leaf cuttings, seeds or divisions) and the blooming period. There is also a list of sources of supply for some house plants, always a big help in trying to put ideas to work.

MARY F. (MRS. J. B.) JOHNSON
Pompton Lakes, N. J.

TREES AND THEIR STORY. Dorothy Sterling. 119 pages, illustrated with photographs by Myron Ehrenberg; indexed. Doubleday, Garden City, N. Y. 1953. $2.50.

This is an unusual book. Refreshingly, it does not repeat the oft-used method of describing trees as individuals and systematically telling how to recognize them. TREES AND THEIR STORY is a prose poem of tree facts. It views trees collectively. In rapid-fire succession it gives the reader facts about the drama and beauty of trees as seen in their marvelous details and their settings and seasonal phases. Headings, too brief to be called chapters, are: roots, trunk, leaf, shape, seasons, and so on.

If you dip into the pages casually, the many pictures are confusing in their variety of perspectives, from close-ups of bud openings to broad forest vistas. The way to enjoy this book is to start at the beginning and read every word. Photographs are synchronized with the text so as to make the sentences come to life.

You can read the whole book in half an hour. It is like going for a walk for that length of time, noting the outlines of trees, peering at the details of leaves, and buds, and bark, without delving deeply. It is inspiration rather than information, and the result is a delightful tree experience.

The book is planned like a slide film story, where the measured voice of a narrator points up the sequence of photographs with brief factual statements. The narrative and the captioned pictures are not always accurate, but somehow that doesn't affect the pleasant experience of the book. It is too bad that photographs taken with care and patience have been reproduced by a process which loses detail and detracts from their clarity.

A page on conservation shows a field of ugly stumps. Here an opportunity is lost to speak of up-to-date, progressive practices in forestry, such as the growing of trees as crops. Many of the largest paper and lumber companies are insuring a continued and increasing supply of trees for commercial uses, recreation, and wild life, to keep America beautiful.

RUTHERFORD PLATT
New York, N. Y.

A HANDBOOK OF CROCUS AND COLCHICUM FOR GARDENERS. E. A. Bowles. 222 pages, illustrated, indexed. D. Van Nostrand, New York. Rev. ed. 1952. (Printed in Great Britain.) $7.50.

The first edition of this work by the eminent authority, E. A. Bowles, appeared in 1924. This present edition has been revised and augmented by several new chapters and the enlargement of most of the others, as well as an increase in the number of full-page illustrations to a total of twenty-seven for crocus, nine of them in full color, and five for colchicum, three of which are colored. There is a glossary of the botanical terms used for crocus and colchicum. An index compiled by W. T. Stearn supplements the text by giving concise references to the books and periodicals where the specific names of colchicum and crocus were first published (these references were not always understandable to the reviewer of the book, owing to the abbreviations used). There are twenty-four chapters, fourteen of them on crocuses, nine on colchicums, and one on the closely related genera of *Bulbocodium* and *Merendera*.

This book is an exhaustive treatise on the botanical characters, distribution, and native habitats, propagation and culture of some three hundred fifty-five species, varieties and hybrids, of which two hundred fifty-three are for crocus and one hundred two for colchicum. The text is illustrated by very beautiful plates and they are undoubtedly accurate botanically.

There seems to be no mention of certain varieties and hybrids that are listed in some of the recent bulb catalogs, among them being such outstanding ones as *Crocus tomasinianus* Whitewell Purple, *C. t.* Barr's Purple, and the Dutch hybrid crocuses Excelsior and Grand Maitre. However, this may be just carping criticism in view of the enormous scope of the subject matter so adequately dealt with.

This is no book for the gardener who is terrified by botanical names and descriptions. For those, though, who have a real love of these delicately beautiful members of the plant world, this should be an invaluable aid in forming a collection of both crocus and colchicum.

EDITH C. LAWTON
Plainfield, N. J.

FLOWER ARRANGEMENT AT THE CROSSROADS. Emma H. Cyphers. 219 pages, illustrated, indexed. Christopher Publishing House, Boston, Mass. 1953. $4.

If, after reading the numerous books on flower arrangement which have been published recently, you are looking for something different, something with a new angle, you are likely to find it in Emma Cypher's recently published FLOWER ARRANGEMENT AT THE CROSSROADS. Here is a new approach to a subject which has been worn somewhat threadbare of late.

The author, an expert arranger herself, with a decided flair for originality, discusses situations and problems which may arise and their possible solutions—all spiced with a delightful combination of humor and common sense.

In a fascinating succession of chapters she traces the history of design from ancient Egypt and Greece, through the lavish Dutch and Flemish flower paintings, to the lightness and grace of the typical bouquets of the French Empire. As the author tells us, "fashions in bouquets change just as surely as do styles in clothing."

There is a chapter on color, with comments in defense of the despised magenta. Suitable containers are discussed, with an appeal for clear glass with its effect of coolness on hot summer days. An interesting chapter on so-called weeds emphasizes the virtues of the lowly mullein, goldenrod, and Queen Anne's lace, all of which provide valuable material for the arranger alert to the beauties of common plants native to our woods and fields.

Form, line, and texture are also touched upon, with emphasis on the imagination and creative freedom of the individual arranger.

There are a series of plates at the end of the book, chosen to illustrate the arranger's response to the author's plea for "emotional appeal" in every composition.

RUTH E. (MRS. REGINALD) WILSON
South Orange, N. J.

FLOWER ARRANGEMENT WORKBOOK. Myra J. Brooks. 64 pages, illustrated (photography by Jack Roche); indexed. M. Barrows, New York. 1953. $2.50, clothbound; $2.00 spiral.

This is a book that brings to the novice excellent ideas in using her garden flowers and greens. All too often, the emphasis is on a great quantity of material which can be obtained only at a florist.

In her workbook No. 1, the author has stressed the use of a few flowers; this, with a basic green arrangement, can be freshened and changed in a few minutes.

The use of greens from trees and foundation plantings is excellent. The most inexperienced could follow these steps with the pictures and make a charming arrangement for the home.

The mechanics described and pictured, along with the suggestions of homey household articles to be used for containers, is clear and concise.

Not only does this workbook cover the different types of arrangements, but the different seasons as well. Here one can learn how to make a summer arrangement for the dining table or a Christmas door swag or mantel arrangement. Fruits and vegetables for the Thanksgiving table, as well as miniatures for the small table or desk, are described. The process of securing the fruits and vegetables in an arrangement will make easy an otherwise difficult task.

Workbook No. 2 will be eagerly awaited and this excellent teacher will, no doubt, lead her students deeper into the creative art of flower arrangement.

As Mrs. Brooks is one of New Jersey's best and well-known arrangers, any lessons that she imparts will be advantageous, not only to the beginner, but to all who enjoy making flower arrangements, whether for the home or that all-important flower show.

HELEN H. (MRS. JOHN M.) LANGENBERGER
Navesink, N. J.

LANDSCAPE FLOWER ARRANGEMENTS. Naida Gilmore Hayes. 96 pages, illustrated (photography by Helen D. Faas). Studio-Crowell, New York. 1953. $3.50.

In LANDSCAPE FLOWER ARRANGEMENTS, Naida Gilmore Hayes has produced a book of real inspiration for the casual flower arranger. Her use of dry materials—rocks, wood and weeds, pods and berries—suggests a pleasing variation to the usual arranger's repertoire. Her choice of very lovely figurines adds life, movement, and interest to her small landscapes. Such a collection would be the envy of any ardent arranger and represents, no doubt, the accumulation of years—since such good figurines are not found in every ordinary shop.

Her chapters on design, weeds and seeds, rocks, leaves, etc., are very well written and should excite an interest in the collection of these useful properties for the store room and later use of the arranger. Her containers are well chosen, being of excellent form and texture, and her materials, while not shown in color, sound delightfully harmonious and pleasing.

Scale in some of the illustrations is not always well considered. Containers could often be larger for the size and weight of the arrangement materials, or the figurines could be in better balance. A few arrangements are quite childish. Some are a bit confusing with their multiplicity of lines.

The chapter on holiday decoratives hardly belongs in a book on "landscape arrangement." However, Mrs. Hayes has given us some inspiring ideas that can be adapted to holiday usage. Her "how to do" tips should prove helpful indeed.

Her source of supply list at the end of the book will be very helpful to those who cannot collect their own materials or who wish some "foreign" seeds, pods or foliage.

The photography is exceptionally good.

CARL STARKER
Jennings Lodge, Oregon

STYLING CORSAGES WITH GARDEN FLOWERS. Mary Hazel Drummond. 247 pages, illustrated, indexed. Macmillan, New York. 1953. $4.75.

This comprehensive volume is filled with excellently thought out ideas for anyone interested in wearing flowers. Complete instructions are given to make beautiful and distinctive corsages from flowers that are grown in almost every garden. The clear, step-by-step instructions and numerous drawings will enable the reader, in no time, to make corsages with a professional look. To accomplish this, fine points in color harmony are thoroughly discussed and the author introduces you to a wide variety of

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"The Arboretums & Botanical Gardens of N. America," by Dr. Donald Wyman
(reprinted from "Chronica Botanica" Vol. X, July 1947).
Published by **American Assoc. of Botanical Gardens and Arboretums**
Available from **C. W. Fenninger, Sec.-Treas., 1632 Chestnut St., Phila. 3, Pa. Price $1.50.**

usual foliage to enhance the flower combinations. Many suggestions are given for holiday and special-occasion corsages and the tying of bows and ribbons is fully explained.

WYNNE C. HESCOCK
Mamaroneck, N. Y.

IN YARDS AND GARDENS. Margaret Waring Buck. 71 pages, illustrated by the author; indexed. Abingdon-Cokesbury Press, New York and Nashville, Tenn. 1952. $3.

IN YARDS AND GARDENS Margaret Waring Buck has opened a whole world of interest, not only to children, but to parents and teachers. Nature study should start when the first observation is made by a curious child, and this same curiosity should be encouraged through the years until it becomes a fixed habit never to be lost.

This book takes up the miniature world of which the child, lucky enough to be brought up with a garden, may become aware as soon as he can toddle. The flight of a bird, the fascinating thousand-legged worm on the path, the magic flitting butterfly, the perfume and color of flowers, the marvelous taste of a nibbled vegetable from his own little plot, the diamond sparkle caught in a spider's web—this book will bring all this to tne reader and be a valuable reference for the thousands of questions which will pour forth, if interest is once aroused and never stifled by being brushed aside.

The text is exceedingly well written in simple language, but with complete authority. The black and white drawings by the author are clean-cut and tell their story clearly.

The book was suggested by Marie Gaudette, Nature Director for the Girl Scouts of America, and she may be very proud of the flowering of her idea.

MARGARET MCKENNY
Olympia, Washington

FIELD CROP INSECTS. F. A. Fenton. 405 pages, illustrated, indexed. Macmillan, New York. 1952. $5.75.

Dr. F. A. Fenton has gone a long way to fill the urgent need of field and forage crop entomologists, grassland farmers, and all others interested in forage and field crops for an up-to-date reference book on insects of field crops. Until the appearance of this text, there was only one other book of note published in this field and that book is fifteen years old today.

Professor Fenton covers many aspects of field crop insects and their control. He has a timely section on insecticides and various types of machinery for their application. Besides chemical control, he discusses cultural, biological, and physical control which are of interest when one is working with low value field crops where the margin between profit and loss is small.

The book is unusually well illustrated with pictures of various destructive insects, their damage, and machinery for their control.

Dr. Fenton discusses many field crop insects, particularly those of the Midwest and West, and divides the pests on the basis of their feeding habits. Unfortunately for the Easterner, he has omitted some of the most important pests of field crops in that section.

It is an excellent reference book for the vocational agricultural teacher and the grassland farmer who is interested in the insects themselves. It has the common failing of most books of being outdated as far as the chemical controls are concerned, before it is published. For the farmer interested in latest methods and materials for chemical control of field crop insects, one is advised to check with the local county agricultural agent or with your state college. All in all, however, one would have to list it as a good book with much good information chucked into its four hundred pages.

GEORGE G. GYRISCO
Dept. of Entomology
Cornell University Agr. Exp. Station

INSECT FUNGUS AND WEED CONTROL. E. R. de Ong. 400 pages, illustrated, indexed. Chemical Publishing Co., New York. 1953. $10.

Dr. de Ong's experience as a consulting entomologist and agricultural technologist makes him one of the very few capable of writing such a comprehensive book. The title is a bit misleading, for the book contains a lot more than it implies. Besides chapters dealing with insecticides, fungicides, and herbicides, there are many others including such widely diverse subjects as seed disinfectants, livestock insects, household pests, fumigants, forest insects and diseases. Control measures stress the use of chemicals primarily. A final chapter includes the very latest spray materials and control measures.

This is an important reference book for pest control operators, agricultural specialists, plant pathologists, entomologists, horticulturists, and students in colleges of agriculture, but is a bit too technical for home gardeners. One must at least thumb through the book to appreciate the great amount and variety of information it contains.

P. P. PIRONE

NEOMYCIN. Selman A. Waksman (with collaboration of others). 219 pages, illustrations, figures, tables; indexed. Rutgers University Press, New Brunswick, N. J. 1953. $4.

In this book Dr. Waksman and those contributing chapters have summarized our present knowledge of the microbiological, chemical, and clinical aspects of neomycin. The subjects discussed include the isolation, characterization, and behavior in culture of the organism-producing neomycin; isolation of neomycin and its chemical and physical properties; antibacterial activity *in vitro;* pharmacological studies; clinical trials in human and veterinary medicine; and the chemotherapeutic potentialities of neomycin. The book is concluded with a list of two hundred twenty-four citations to the literature and a subject index. Anyone having a special interest in neomycin will find this book useful as a ready reference.

ALMA W. BARKSDALE

RESEARCH IN THE ECONOMICS OF FORESTRY. William A. Duerr and Henry J. Vaux (editors). 475 pages, including index. Charles Lathrop Pack Forestry Foundation, 1214 — 16 St. N.W., Washington 6, D. C. 1953. $6.

This is the culmination of a three-year project carried on by the editors under a grant from the Charles Lathrop Pack Forestry Foundation. More than sixty authors collaborated in the preparation of one hundred twenty-seven topic discussions. The past developments in forest research, forest economy, forest managements, forest-product harvesting and processing, demand and supply of forest products, are adequately covered.

Both editors have had experience in government service, are holders of forestry degrees and of the Ph.D. in economics. Dr. Duerr is presently professor of forest economics at College of Forestry, New York State University; Dr. Vaux is professor of forest economics at the School of Forestry, University of California.

GRASSES AND GRASSLAND FARMING. Hi W. Staten. 319 pages, illustrated, indexed. Introduction by Louis Bromfield. Devin-Adair, New York. 1952. $5.

In his introduction to this book, Louis Bromfield states that not the least part of the change "from the frontier-wilderness type of agriculture toward a partly new and in many ways wholly fundamental kind of farming" is the "recognition that all men, all beasts are grass, not strictly the botanical family of grasses, but the whole wonderful family of legumes."

Grasses and legumes are the cheapest and best feed of the millions of cattle and sheep grazing in the United States, and Professor Staten in GRASSES AND GRASSLAND FARMING shows how the farmer can obtain maximum production of the grasses per acre, increase his livestock products, and at the same time conserve his grass stand and soil.

He has not written a textbook, but a practical presentation of the vital importance of grasses to farmers, based on his own lifetime devotion to farming and soil conservation and to teaching good pasture management.

USING COMMERCIAL FERTILIZER. Malcolm H. McVickar. 208 pages, illustrated, indexed. The Interstate, Danville, Ill. 1952. $2.50.

Dr. McVickar, who is one of the leading authorities in the United States on soil improvement and commercial fertilizers, has written this book primarily for adults and youths enrolled in farm training programs. However, others who are interested in soil improvement will find much valuable information within its covers. The contents of the book are based on the author's own personal experience and observations in farming and on educational and factual information from the agricultural experiment stations and the National Fertilizer Association.

THE WILLIAMSBURG CALENDAR FOR ENGAGEMENTS & ALMANACK FOR THE YEAR 1954. Calendar with text; illustrations by Elmo Jones; daily engagement or diary pages. Dietz Press, 112 E. Cary St., Richmond 19, Va. 1953. $1.50.

A delightful calendar and engagement book—with quaint, humorous, philosophical, and patriotic quotations from the past; also twelve antique-style almanack pages and twelve full-page pen and ink sketches by Elmo Jones, depicting notable Tidewater, Va., plantations and some of the historic buildings at Williamsburg.

GARDENING IN SAN ANTONIO AND SOUTH TEXAS. H. R. Newcomer and Roy C. Bates. 131 pages, illustrated, indexed. Naylor Co., San Antonio, Texas. 1953. $2.50.

H. R. Newcomer, chief gardener at the Alamo for the past nine years, and Dr. Roy C. Bates, green-thumb columnist for the San Antonio Express, have pooled their love and knowledge of plants and written this compact, informative book for the new home owner-gardener in San Antonio and South Texas.

BETTER LANDSCAPING FOR YOUR HOME. John Hayes Melady. 184 pages, illustrated by Eva Melady; indexed. Grosset & Dunlap, New York. 1953. $1.50.

John Hayes Melady has added another to his series of garden books—this time it is a guide on landscaping. It is a useful and practical little book for the property owner who wants to develop his home grounds himself and needs advice on such topics as foundation planting, groundcovers, climbers, hedges. The book includes lists and descriptions of plants suitable for particular purposes, and is well illustrated by the author's daughter, Eva Melady.

TELLING TREES. Julius King. 127 pages, illustrations by Richard G. Sigafoos; indexed. Wm. Sloane Associates, New York. 1953. $2.

More than a hundred of the more common trees are described in the field handbook and reference guide. The author, who has written a number of books on birds, animals and plants, lives in upstate New York in what was a virgin pine forest, and knows and loves trees. Richard A. Sigafoos, formerly an instructor at the Albright Art School, has illustrated the book with clear representations of leaves, the means by which the average layman strives to identify trees.

HOUSE PLANTS. EVERYDAY QUESTIONS ANSWERED BY EXPERTS. F. F. Rockwell and Montague Free (edited by). 159 pages, introductions by Helen Van Pelt Wilson and Esther C. Grayson; illustrated, indexed. Garden City Books, Garden City, N. Y. 1953. $1.50.

Selected from the many questions which are received by the editors of "The Home Garden" are the 1,000 questions and their answers which comprise this compact book. It covers information on over two hundred specific plants and their varieties, many of them unusual and exotic.

An introductory chapter on the care of house plants, propagation, etc., by Helen Van Pelt Wilson and Esther Grayson adds to the book's value.

THE TRUE BOOK OF PLANTS WE KNOW. Irene O. Sevrey Miner. 44 pages, illustrated by Irene Miner and Karl Murr. Childrens Press, Chicago, Ill., 1953. $2.

In pictures and the simplest of text, the inquiring mind of the very young is acquainted with the part plants play in daily living.

MICROBES AT WORK. Millicent E. Selsam. 95 pages, illustrated by Helen Ludwig. William Morrow & Co., New York. 1953. $2.

Miss Selsam has the gift of presenting information on living and growing things in words that are readily grasped and enjoyed by her young friends.

In her latest book, MICROBES AT WORK, she explains the microbe world and suggests simple experiments which the young reader can carry out in his home and then see for himself how microbes work.

THE FIRST BOOK OF PLANTS. Alice Dickinson. 93 pages, illustrated by Paul Wencke; indexed. Franklin Watts, New York. 1953. $1.75.

Paul Wencke has beautifully illustrated this fascinating little book. Its contents will appeal to the lively young mind which is curious about the plants around him—the algae, lichens, mosses and ferns, as well as the more familiar subjects.

ELEMENTARY LESSONS IN GARDENING. Paul R. Young. 106 pages, illustrated. National Garden Institute, Columbus, Ohio. 1953. $1.

"School Gardengram" lessons and other data on school gardening has been compiled into a valuable book for school authorities, garden club members, and others interested in fostering the school garden programs in their respective communities.

The author, Paul R. Young, school garden supervisor of the Cleveland Board of Education, for more than twenty-five years, is the outstanding person in the school garden movement in the United States.

THE JUNIOR BOOK OF INSECTS. Edwin Way Teale. 249 pages, illustrated with photographs and drawings by the author; indexed. E. P. Dutton, New York. New and completely revised edition, 1953. $3.75.

In this revised edition — there have been six printings, since the book was first published in 1939 — the author has found "little to change but a number of things to add, for the ways of insects alter little," "it is our knowledge of them that continues to expand."

THE REAL BOOK ABOUT BUGS, INSECTS AND SUCH. Jane Sherman. 192 pages, illustrated by Kathleen Elgin; indexed. Garden City Books, Garden City, N. Y. 1952. $1.25.

One of the "Real Book" series, in which boys and girls from nine to twelve years seem to delight, this particular book provides them pleasantly informative and educational reading on the scorpion and dragon fly, the honey bee and the "seventeen year locusts," the praying mantis, and others.

SURVEY OF BIOLOGICAL PROGRESS. Volume II. George S. Avery, Jr. 333 pages, illustrated, indexed. Academic Press, New York. 1952. $7.

Volume I of the Survey published in 1949 was given favorable reviews by Vernon Bryson in the "Quarterly Review of Biology" and by Fanny-Fern Davis in "Science." The purpose of the surveys was to review the subject of biology in a way that would be acceptable to the specialist and at the same time satisfy the teachers and scientists in marginal or unrelated fields. There is a mild attempt to integrate the various fields of biology.

A. H. Sparrow and B. A. Rubin, in the chapter on "Effects of Radiation on Biological Systems," consider the history and types of radiation, dosages, the distribution of energy, the relation between chemical and biological effects, carcinogenesis, and embryological and developmental effects of radiation. More than two hundred references are included with this chapter.

(Continued on page 199)

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NEWS, NOTES and COMMENTS

Dr. Cowan Returns to the Garden. Dr. Richard S. Cowan, Assistant Curator of The New York Botanical Garden, returned the middle of September following a year's study in England and on the European continent under a postdoctoral fellowship awarded by National Science Foundation.

He has been for several years a member of the Garden's team studying the flora of Venezuela and the Guianas; the legume family is his primary responsibility in this project. The specific problem selected for the fellowship study was *Swartzia,* a common genus of the area being considered, but the entire family in tropical America received attention during his study abroad.

The following has been extracted from his "Progress Report to the National Science Foundation." Editor.

The original intent was to restrict my study to the tropical American representations of the genus *Swartzia,* but the problem was expanded to include the two species of the genus in Africa, thus making it more complete taxonomically. This expansion seemed especially desirable, since the most important of the early African collections are housed in European herbaria. Because it is always desirable to gain some understanding of the phylogenetic relationships within a group, the scope of the problem has been expanded to include the entire tribe Swartzieae. This is not so great an extension as might be imagined, for, actually, it adds only twenty species of related genera.

The first four months were passed at the British Museum (Natural History) and the second four at the Royal Botanic Gardens at Kew, England. Both periods were extremely profitable and productive, for not only the types of many species of *Swartzia* and related genera were studied but all the non-type material on deposit in these institutions as well. While the collections in both herbaria are world-wide in origin, they are particularly valuable for material from the West Indies, Brazil, and British Guiana. In addition to these studies some 3,700 photographs of type specimens of the legumes and other families were made. These will be of the utmost importance in our future floristic studies in tropical America, and it should also be emphasized that these photographs will be made available to all other botanical institutions of the world by The New York Botanical Garden.

The herbarium at the Museum National d'Histoire Naturelle, Paris, was visited for a period of nearly four weeks. In this institution it was possible in that time to study in detail all their material of the tribe Swartzieae and a photographic record was made of the most important specimens studied. The Paris Herbarium was also a key institution for my project, as here are housed the best collections of plants from French Guiana and French possessions in the West Indies.

I had expected to study at the herbarium of the Jardin Botanique de l'Etat, Brussels, for a month, but, although there was much of interest in that collection, the study was completed in two weeks. The two weeks thus gained permitted me to visit an institution, the Botanical Museum of the University, Utrecht, Netherlands, which I had reluctantly omitted from the original plans. In this herbarium is assembled the best representation of plants from Surinam (Dutch Guiana) in the world.

The following three weeks were spent in a detailed study of the material at the Conservatore et Jardin Botanique, Geneva, Switzerland. This period was particularly productive, for it is in this institution that the DeCandolle Herbarium is preserved, along with other herbaria of great scientific interest. The DeCandolle collection is of much interest and importance to me as a student of the Leguminosae, for one of the few relatively complete treatments of the family was produced by this great taxonomist in the early part of the last century and the basic materials for his studies were in his herbarium.

Nearly two weeks were utilized in the herbarium of the Botanische Staatssammlung, Munich, Germany. This center proved to be surprisingly rich in materials from

tropical America, at least in the Leguminosae. This herbarium is notable because of its being the basis for the monumental Flora Brasiliensis, the starting point for students of the flora of northeastern South America.

The herbarium at the Natural History Museum, Vienna, Austria, contains the collections of several botanists who studied the flora of tropical America whose specimens are not represented in other herbaria, such as Karsten in Colombia and Venezuela, Schott and Pohl in Brazil, Poeppig in Brazil, etc. Thus, the three-week period spent there was of utmost importance to my studies. As always, photographs were taken of the important specimens, but, in addition, some 1,500 photographs were made of a collection of unpublished plates. These drawings have assumed unusual importance because the specimens upon which these species were based were burned in a disastrous accident just after the last war. These photographs will also be made available to the botanical world by The New York Botanical Garden.

Enroute to Genoa, Italy, to board ship for the return trip to America, I spent two days in the herbarium of the University of Florence, Italy. This short visit enabled me to see three type specimens which I could not have seen elsewhere. I also noted collections which duplicated specimens seen at institutions previously visited and studied in detail collections which had not been seen by me in other herbaria.

There are three distinct phases to the solution of taxonomic problems. In the first phase the raw materials are assembled, including bibliographic data as well as the results of purely morphological investigation. The second phase consists of a synthesis of the data acquired in the first phase into a reasonable working system. The third and final phase consists of the organization of the study into a presentable form for publication. In my study of the Swartzieae all the bibliographic and morphological data are assembled and ready to be utilized in the second phase. It is hoped that within a year this study will be completed and ready for publication.

New Laboratory. The final plans for the new laboratory of The New York Botanical Garden are expected to be completed by the architects, Brown, Lawford, and Forbes, before the end of the current year, and ground will be broken in the spring of 1954. It is now planned to locate the laboratory on the expanse of lawn across from the Museum and Administration Building.

Lorillard Snuff Mill. Renovation of the Lorillard Snuff Mill into a garden center and restaurant has been delayed by unforeseen circumstances. The excessively wet spring created problems that hampered work by the contractor, and the prolonged teamsters' strike held up delivery of materials. However, the work has progressed so satisfactorily in recent weeks that there is every indication that the Lorillard Snuff Mill will be completed to permit its opening early in the spring of 1954. This will be a very inviting place — the building itself architecturally attractive, the surroundings naturally beautiful.

Gift to the Library. The Library of The New York Botanical Garden has been augmented by a gift from Mrs. Robert H. Montgomery of approximately one hundred fifty volumes dealing with horticulture and botany and thirty-five beautiful plates in color from the elephant folio "Pinetum Britannicum" by Edward James Ravenscroft. This valuable acquisition was part of the library of the late Colonel Robert H. Montgomery.

"Open House." Dr. P. P. Pirone, Plant Pathologist, will be present at "Open House" for members of The New York Botanical Garden and their guests in the Downtown Members' Room on November 10, 3:30 to 5:30 p.m., to answer questions; Louis P. Politi, Head Gardener, will be present at "Open House" on December 8.

Downtown Lecture Series. The Downtown Lecture Series of The New York Botanical Garden will be held in the auditorium at 22 East 60th St., as follows: January 7, "Following Spring Across Europe," by Miss Alice Chauncey, with pictures of gardens in Italy, Portugal, Switzerland, Holland, and England; January 14, "Lilacs and Peonies, Their Place in the Modern Garden" by John Wister; January 21, "America's Floral Treasures" by Dr.

H. N. Moldenke; January 28, "Chemicals in Modern Gardening" by Dr. P. P. Pirone. Further information will be sent to all members. The lecture series will be open to non-members. The fee for members will be $4.00, for non-members, $6.00, for the entire series. Mrs. Clarance Stanley is Honorary Chairman; Mrs. Oakley Sheldon, Chairman; and the Vice-Chairmen are Mrs. Percy Douglas, Mrs. Benjamin F. Few, Mrs. Charles G. Stradella.

Show Wing Temporarily Closed. The show wing of the Museum Building of The New York Botanical Garden will be closed temporarily for painting and repairs. This work will be undertaken immediately following the close of the exhibition "Cotton From Fable to Fashion." At the time of writing it is not certain whether there will be a Christmas Show by the Display Committee as originally planned, for the painting and repairs of the show wing and rotunda may prevent.

Appointment to Garden staff. Dr. Richard M. Klein has been appointed Research Associate of The New York Botanical Garden. He came to the Garden from the University of Chicago the middle of October.

Honors to "Modern Gardening." "Modern Gardening" by Dr. P. P. Pirone, Plant Pathologist of The New York Botanical Garden, has been chosen to be the February selection of the American Garden Guild Book Club.

Seedless Grape Project. Dr. A. B. Stout, curator emeritus of The New York Botanical Garden, spent a week at the New York State Agricultural Experiment Station at Geneva, N. Y., to check the progress of the project in breeding seedless grapes, which has been a cooperative effort between The New York Botanical Garden and the Station since 1919. Several reports have been made in The Garden Journal on the introduction of these seedless grapes. Dr. Stout brought back a collection of fruits of some twenty best and they were on display at the Garden for several days. Included was "Interlaken," which is being sold by nurserymen and being grown to an increasing extent. It is a promising seedless grape for the eastern United States; at Geneva, it ripens about September 1 or a full month before "Concord."

"Town and Country Flower Show." The Town and Country Flower Show, held in Westchester County Center, White Plains, N. Y., September 24 - 27, under the auspices of the Ninth District of the Federated Garden Clubs of New York State, benefited the Veterans' Rehabilitation Through Garden Therapy Program.

The collection of the official state flowers of the forty-eight states and two territories, assembled by The New York Botanical Garden two years ago, was loaned to the Town and Country Show by the Garden. Each state flower is pressed and mounted on glass—a duplicate of the collection is on permanent display in the Jardin de Bagatelle.

An innovation at this show was the coordinated color background, planned by Rahr Color Clinic, which enhanced the floral displays.

National Association of Gardeners Convention. Dr. Henry Skinner, Director of the National Arboretum, Washington, D. C., and Dr. Curtis May, Chief Pathologist, U.S. Dept. of Agriculture, were speakers on the educational program of the 39th Annual Convention of the National Association of Gardeners, held in Washington, D.C., October 6, 7, 8.

The Association recently moved its headquarters to 194 Old Country Road, Mineola, L.I., where mail should be addressed to the Executive Secretary, Edith A. Medlock.

Biography of Liberty Hyde Bailey. George H. M. Lawrence, Director of the Bailey Hortorium, Cornell University, is engaged in the preparation of a biography of Liberty Hyde Bailey, world-renowned horticulturist, who celebrated his ninety-fifth birthday on March 15 last. The biography will be published by Macmillan Company, which has made available to Dr. Lawrence records covering sixty years of publishing relations with Dr. Bailey. In 1951 Dr. Bailey and his daughter, Ethel Z. Bailey, turned over personal records to Dr. Lawrence, and Dr. Lawrence would like to hear from anyone who has recollections of events shared with Dr. Bailey between the years 1900-1935.

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BOOK REVIEWS **(from page 197)**

H. Kalmus deals with his subject, "Progress in Human Genetics," as a mass of controversial material and opinions of those who do research in this field. He discusses hereditary traits, linkage, mutation rates, blood antigens, compatibility, population genetics, and eugenics.

Gordon A. Riley concerns his chapter on "Biological Oceanography" largely with a review of the ecology of marine population.

For the small liberal arts college, this is a text well-suited for a one-semester course in botany which is so often all that is offered. The usual textbook designed for one semester is oversimplified and lacks the completeness of this botany text. INTRODUCTORY PLANT SCIENCE would serve adequately for a year's course, if supplementary references were made available by the teacher. It is suitable for biology majors as well as those who would only have this interesting introduction to the subject.

Erwin Bünning deals with chemicals as regulators and determiners for growth and organ formation in the chapter on "Morphogenesis in Plants." He states that differentiation can be understood only by examining reactions within the plant itself.

Louis G. Nickell makes reference to other reviews and specializes in practical applications of plant hormones.

Florence Moog, zoologist, reviews methods of histochemistry and L. H. Bretschneider reviews the work on structure of protoplasm with special reference to use of electron microscope.

A chapter on reproduction by Aubrey W. Naylor is concerned with factors in environment and changes in physiology associated with the production of sex structures of all kinds of plants.

As with all surveys, the reviewers are faced with the problem of evaluating reports with which they are not directly associated. However, Volume II is a valuable contribution for both teachers and students.

P. W. ZIMMERMAN
Boyce Thompson Institute
Yonkers, N. Y.

TEXTBOOK OF BOTANY. E. N. Transeau; H. C. Simpson and L. H. Tiffany. 817 pages, illustrated, indexed. Harper & Bros., New York. Rev. ed. 1953. $6.

The original edition of this book was hailed by many teachers of elementary botany as a break from more formalized styles of presentation and arrangement of subject matter. To those whose pedagogical propensities were properly attuned to the authors' notions of how all phases of introductory botany should be taught, the original edition was of immense help. The revised edition is cut from about the same pattern, and users of the text may be certain that workbooks developed by them for the original edition will serve for the revised.

Changes that do occur are almost entirely for the better. For examples, the interpretation of plant behavior is much better written in the revised edition, Flowering-Plant Families and Evolution of Cultigens is a much improved substitution, and the few sentences on hornworts are welcome. Yet one might have wished, for example, for more on crossing-over, together with illustrations.

There are still rather astonishing expressions in the chapter on stem structure, life is still confidently defined on page 63, and ovules remain unimportant in seed formation (see Selaginella). For much of the text, however, there is little to criticize and much to praise.

Those interested in providing a modern classification of plants and then using it in a challenging fashion will again be somewhat disappointed in the book. If the authors had the same motivation and skill for presenting this subject as they have shown elsewhere, the book would be difficult indeed to better.

DR. VERNON I. CHEADLE
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POLLEN MORPHOLOGY AND PLANT TAXONOMY. G. Erdtman. 539 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass. 1952. $14.

Though the author modestly gives this work the subtitle, Introduction to Palynol-

(Continued on page 200)

from the HERB SHELF

"Go count with thy coffers, when harvest is in,
"Which way for thy profit to save or to win;
Oft' one or them both, if a savour we smell,
House-keeping is godly, wherever we dwell.

—*Thomas Tusser*

A little of the sadness of approaching winter is mitigated by the presence of green plants indoors. If the plants have the "savour" of sweet herbs, there is always promise of spring in their employment in salad and sauce. Pots of shrubby evergreen rosemary, scarlet-flowered, fruit-scented pineapple sage, and velvety peppermint-geranium make a pretty frieze of gray and green foliage when set on a glass shelf in a sunny window casement. Sweet marjoram may hang from a basket type pot, where its trailing stems tufted by tiny white blossoms at the ends will dangle down.

All winter you can snip bits of marjoram into egg and cheese dishes, or tuck needle-like leaves of rosemary into slits made in a leg of lamb before roasting. A leaf of peppermint — or rose-geranium is attractive pressed under the base of a stemmed crystal sherbert dish piled high with fruit compôte and garnished with pineapple sage. The uses of the window-sill herb garden are myriad.

More for the cook than the flower arranger and so best relegated to the kitchen window or glassed-in back porch are small plants of parsley, dill, fennel, and basil. They must be seedlings which were started in late summer or volunteers found during the fall clean-up of the garden. It just doesn't work, outside a greenhouse, to begin with seeds during the gray days of November and December. Germination will occur, but the growth that follows will be too weak from lack of sun to stand cutting for culinary use.

Tarragon, chives and mint are treated like bulbs for forcing. The roots are placed in a shallow pot with a mixture of garden loam, sand, and peat moss or compost in equal parts. Then the pans are sunk in the ground and allowed to freeze for two months. When they are brought in to a sunny window, the shoots will sprout rapidly and be ready for cutting in a week or ten days.

With adequate watering, frequent syringing with a fine spray of cool water, and weekly feeding with a balanced plant food, almost any of the herbs mentioned above will last until the first green spears of chives show in the garden. Prune herbs in the window garden judiciously. Do not cut off all the tops and then expect them to continue growing. If the pineapple-sage starts to get tall and spindly, pinch out the tips often enough to keep it branching. Cool temperatures are much better for sweet herbs than intense heat. Keep the pots away from the drying influence of a radiator or register.

GERTRUDE B. FOSTER

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CHRISTMAS GIFTS

BOOK REVIEWS (from page 199)

ogy, it is by far the most complete palynological work on record. It consists of 539 pages of text, together with twelve pages of preface and foreword by H. Humbert, Professeur au Muséum National d'Histoire Naturelle, Paris. There are 261 figures, mostly groups of pollen grains, and one color plate, representing 327 natural families.

As the author points out, palynology is a term coined by Hyde and Williams about ten years ago to mean the science of pollen and spores, dealing with their wall structure rather than their live interior. Because of the immensity of this subject and its presently rapid development, the author has restricted himself to "an attempt to illustrate the main tenor of Angiosperm pollen morphology." The bulk of the book provides a series of short pollen morphological expositions, collocations, and outlooks, family after family.

It is a little disappointing to find that in spite of the title, relatively little attention is paid to the relationship of pollen morphology to taxonomy which always is the natural goal of comparative morphology. The skirting of this subject is justified by saying "the application of pollen morphology in Angiosperm systematics has not yet been properly appraised." Nevertheless, the materials of a comparative morphology are there and are rather consistently pointed up in the family descriptions. This is especially true of the three families Amaryllidaceae, Euphorbiaceae, and Proteaceae, which are the only ones treated exhaustively.

The author points out that palynology has many applications other than to plant taxonomy, as phytogeography, otherwise known as pollen analysis aiming at dating of geological deposits and relating one to the other, and to such related sciences as climatology, glaciology, limnology; also to archeology in the dating of artefacts, skeletons, etc., and to some extent to honey research.

Perhaps the most valuable part of the book lies in its superb illustrations. These are all drawn, except a few photomicrographs, from the author's originals by Anna-Lisa Nilsson. They are designated as "palynograms," which appears to mean that, instead of being faithful reproductions of individual pollen grains, they represent pictorially all that the author was able to find out about them through observations of many grains and much study, thus combining the science of a great palynologist with the skillful portrayal of a trained artist. As the author states, "These will be appreciated even when the rest of the book is out of date."

The pollen-grain forms are described in minutest detail and with meticulous accuracy, and with each description are given the sources of material studied, and, if previously described or illustrated, all the references to the literature. The bibliography lists over 1,000 titles of palynological and related publications. There is also a glossary of 15 pages, without which it would be impossible for the neophyte to read the book, for the language of palynology, largely the creation of this author, has become as strange and detached as that of medicine, mathematics or astronomy.

The second volume, which Professor Humbert tells us in his foreword, is already in preparation, will include the pollen grains and spores of the gymnosperms, ferns and mosses. These two volumes will undoubtedly become, and remain for many years the standard reference work for all palynologists.

R. P. WODEHOUSE
Lederle Laboratories Div.
American Cyanamid Co.
Pearl River, N. Y.

INTRODUCTORY PLANT SCIENCE. Henry T. Northen. 601 pages, illustrated, indexed. Ronald Press, New York. 1953. $5.50.

INTRODUCTORY PLANT SCIENCE possesses a very sound organization, dealing with the basic ideas of the fundamental concepts of botany first, and then going gradually into the more complicated relationships of the subject. The author follows sound pedagogical practice in the presentation of his subject matter.

For the small liberal arts college, this is a text well-suited for a one-semester course in botany which is so often all that is offered. The usual textbook designed for one semester is oversimplified and lacks the completeness of this botany text. INTRODUCTORY PLANT SCIENCE would serve adequately for a year's course, if supplementary references were made available by the teacher. It is suitable for biology majors as well as those who would only have this interesting introduction to the subject.

The importance of botany in human affairs and the rapidly expanding aspects of the science is vividly brought home to the reader by the excellence of the selected illustrative materials and the timeliness of the new developments that are discussed so adequately. The author never takes refuge in generality or ambiguity, but develops an integrated and conceptualized treatment of a dynamic subject.

DONALD G. HARTMAN
Assoc. Prof. of Biology
Bard College

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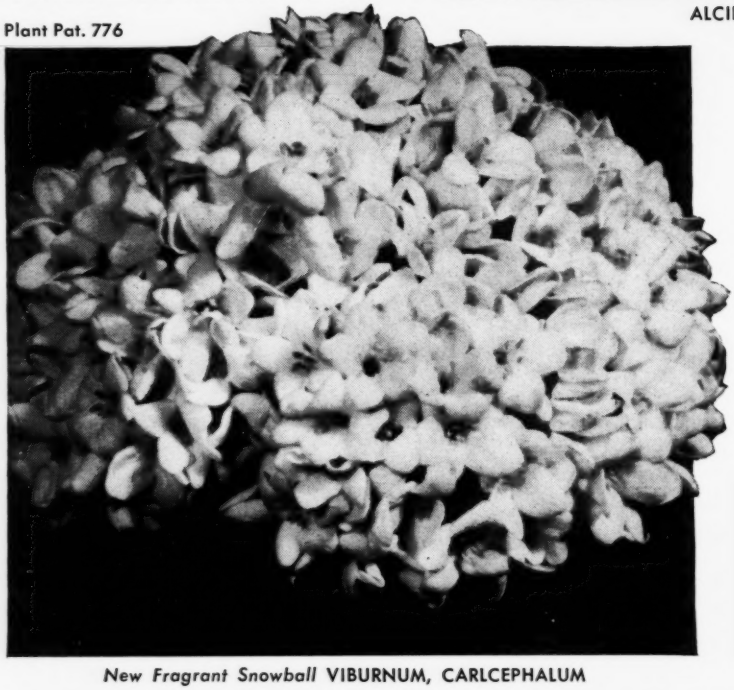

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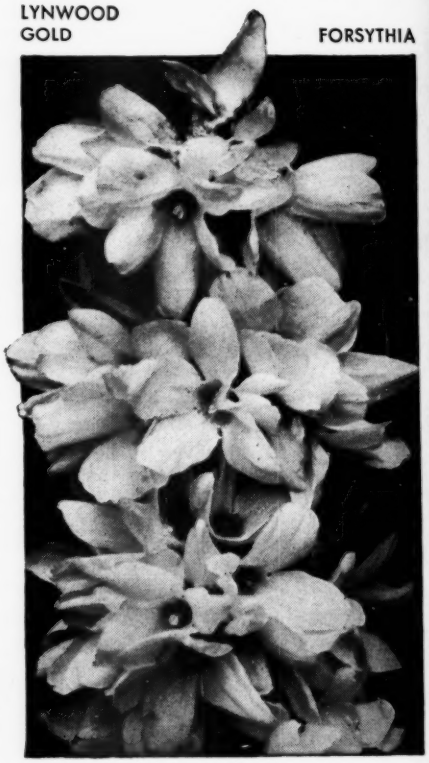

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